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ABSTRACT

A demonstration home provided a parent oriented program and audiologic management for 94 deaf preschoolers (mean age 2 years 4 months). Each child underwent a trial period with different hearing aids before permanent recommendation was made. Parents were present at these clinic sessions; they also received instruction in how to encourage auditory behavior, orient the child to sound, and talk to the child. Findings over 3 years indicated that language age growth accelerated while performance age and nonverbal mental age remained linear. Also, ability to use amplification from the wearable hearing aid improved, with an improved mean threshold response to spoken voice of more than 20 dB. The parents mobilized themselves into pressure groups resulting in legislation for education of deaf preschoolers. Community approval of the project resulted in continuance of its services after federal funding ceased. (Author/JD)

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U.S. DEPARTMENT OF
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TABLE OF CONTENTS

SUMMARY 1

I. BACKGROUND FOR THE STUDY 2

II. METHODS 4

- Description of the Home 4
- Procedures for Admission 4
- Audiologic Evaluation 5
- Audiologic Management 5
- Parent Teaching Procedures 10

III. FINDINGS AND ANALYSIS 13

- The Population 13
- Results of Hearing Measurements 19
- Use of Hearing Aids 24
- Rubella Deafness Group 32
- Other Performance Measurements 39
- Results with Parents 53

IV. CONCLUSIONS AND RECOMMENDATIONS 59

APPENDIX A 62

APPENDIX B 72

APPENDIX C 87

LIST OF FIGURES

1. Summary of mean monaural thresholds for pure tones and mean speech awareness thresholds for the 78 subjects under three at initial examination 20
2. Comparison of mean thresholds, aided and unaided, for pure tone and complex stimuli at first and last visits (Active Group) 27
3. Comparison of mean thresholds, aided and unaided, for pure tone and complex stimuli at first and last visits (Inactive Group) 28
4. Right and left ear pure tone thresholds by air conduction for subject fitted with binaural hearing aids 31
5. Mean response levels to pure tones for 19 rubella deaf children with and without wearable amplification 33
6. Mean audiometric curves for three groups of deaf children classified by period of onset of maternal rubella 36
7. Comparison of mean growth curves depicting Performance Age and Language Age increase as measured by the Communicative Evaluation Chart for 28 deaf children . . 43
8. Comparison of Performance Age and Language Age mean increases during instruction for 28 children subdivided on the basis of Language Age gain 44
9. Comparison of mean unaided and mean aided hearing levels (first and last) for 28 children divided into three subgroups on the basis of Language Age gain 46
10. Comparison of Vineland Social Maturity Scale levels for three groups of children divided on the basis of Language Age gain 47
11. Comparison of lower half (parents' occupational status) with upper half on Language Age gain, number of visits, and Vineland Social Quotient 49
12. Comparison of mean gains in Mental Age Months during 8 - months preschool instruction for experimental group from home teaching program and control group entering a preschool program without such instruction 51
13. Distribution of improvement scores for 40 parents on Information Scale 55

LIST OF TABLES

1. Summary of individual data on 94 subjects by sex, race, and amount instruction 13
2. Family participation data on 94 subjects 14
3. Subjects classified by residence 15
4. Summary data on age and education of parents 16
5. Personal data on homes and families of the subjects 17
6. Income status for subjects' families (N-76) 18
7. Summary of mean thresholds in dB (re 1964 ISO) at first and last test for 94 subjects 21
8. Summary of number audiologic visits per child for 78 subjects under three 22
9. Summary of mean number tests per test signal for 94 subjects 23
10. Summary comparison of first and last thresholds in dB for pure tones and complex sounds for those subjects active in the project 25
11. Summary comparison of first and last thresholds in dB for pure tones and complex sounds for those subjects not active in the project 26
12. Summary of hearing aid recommendations and dispositions for the 94 subjects 29
13. Summary of mean bone conduction responses with standard deviations obtained from better ear responses at each frequency for 12 children 34
14. Summary of mean sound field awareness levels with and without wearable amplification 34
15. Mean Vineland Social Quotient and CEC Language Age and Performance Age at first evaluation 40
16. Summary description of 28 children with respect to parental occupational classification, amount home program instruction, and hearing level for speech 41
17. Pre- and post-instruction comparisons for 28 children on Chronological, Language and Performance Age 42
18. Correlations obtained for Language Age Gain compared with other variables 48
19. Correlations obtained for Occupational Status of Parents compared with other variables 50
20. Distribution of teacher ratings among 22 parents before and after training program 56

SUMMARY

Early detection and treatment for the hearing impaired child, while widely accepted in audiology and deaf education as essential to successful language and education habilitation, has not in practice been widely carried out beyond frequent diagnostic visits. While the audiologist can and does assist in establishing use of the wearable hearing aid, he has for the most part been lacking in concepts of the educational needs of the child at that age level, and thus unable to translate effectively to the parents how to make the auditory capacity more functional. Where service has been provided only by educators of the deaf, the potential of the residual hearing is often neglected. Poor management of the hearing aid thus results in failure to take advantage of one of the most important avenues for learning, and the child by necessity is required to use the visual modality exclusively for intake of language concepts.

The present project was planned to give the parents of hearing impaired infants immediate and continuing help in developing their child's ability to understand and utilize language in the period before he is ready to enter a more formal education experience. The program made possible a much differently oriented service with its greater emphasis on daily life activities as a source of instructional material for development of speech and language skills. The main objectives of the project were: 1) to provide a parent-oriented program appropriate to the needs of the very young child and in which the skills basic to the attainment of language could be practiced on an intensive basis in the child's home; and 2) through intensive audiologic management to take early advantage of his hearing potential by use of wearable amplification so that all possible assistance will be given in learning through the auditory channel.

Each child underwent a trial period with different hearing aids until a permanent hearing aid recommendation could be made. The parents were present throughout these visits so that orientation was provided to the care and use of a hearing aid and the expectations to be derived from it. Within two weeks of their first clinic visit, the families were introduced to the Home where they were seen by the teachers for an initial interview followed by weekly or bi-weekly instruction periods in which the teachers demonstrated to the parents the means of encouraging auditory behavior in the child and how to orient him to the sounds in his environment. The teachers next began a program of instruction on how the parents should talk to their child, guiding them in the development of language on an informal, spontaneous and experiential basis.

Major findings and developments from the three year demonstration project considered most significant are:

1. Language Age growth was markedly accelerated upon entrance to the home program and in comparison to that for

Performance Age and non-verbal Mental Age, both of which remained virtually linear.

2. Ability to use amplification from the wearable hearing aid improved dramatically, as indicated by an improved mean threshold response to spoken voice of more than 20 dB.

3. The parents by virtue of their greater understanding of the nature of their child's problem from an early age were able to mobilize themselves into an effective community and state-wide pressure group, accomplishing improved legislation benefits for the education of preschool deaf children.

4. The project was viewed by the community to be an integral part of the services of the hearing and speech center to the extent that the Center's Board of Directors were unanimous in their support of the service after federal funds ceased.

In conclusion, the present project successfully demonstrated that early intervention in childhood deafness can substantially reduce the degree of handicap in later years. The principles of child development dictate the deaf infant must be given the opportunity to use audition in as nearly as possible the same manner as the normal hearing child does if he is to benefit maximally from whatever residuum of hearing he possesses. Since it is hard to determine this level in infants, all deaf infants should be given the opportunity to hear through use of wearable hearing aids and consistent and continuing acoustic input from the beginning. This auditory training goal will be best accomplished if the parents become intimately involved in the total program for the child and assume the major responsibility for the child's developing use of hearing and language. The emphasis therefore, for hearing impaired children under three must shift from that of a child-oriented one to a parent-oriented program.

CHAPTER I

BACKGROUND FOR THE STUDY

Early detection and treatment for the hearing impaired child is widely accepted in the fields of audiology and deaf education as essential to successful language and educational habilitation. In recent years techniques for early detection of deafness have been emerging from programs of neonatal screening established in many hospitals throughout the country.

Early detection in turn has created a focus on the course of action which should be followed with the family. These efforts have brought into even clearer focus that the goal must be not only to measure the auditory residual of every young child deficient in auditory capacity, but also to capture this residual and help him make the maximum use of it in combination with other sense modalities in his acquisition of language, his educational attainment, and his adjustment to a hearing world. The time period is viewed by those interested in acquisition of child language to be critical, for it has repeatedly been stressed the basic prerequisites, including essential intersensory patterning, are strongly established within the first year of life.

A major factor in the implementation of the present project was the need for service to children from the 1964-65 rubella epidemic, who constituted a huge increase in numbers of young deaf children requesting service from the Hearing and Speech Center throughout the period of the project. While nursery and kindergarten type programs for children three to six have traditionally been offered for a number of years at centers and schools with facilities for the deaf, the number of programs providing intensive service for the child under three, and in particular the infant, has been sparse indeed. The teacher of the deaf has not been in touch with these families to any great extent in the past, and contacts with professional personnel remained limited to audiologists in clinics. While the audiologist can and does assist these parents with establishing use of wearable amplification for the child, he has been for the most part lacking in concepts of the educational needs of the child at that age level, and thus unable to translate effectively to the parents how to make the auditory capacity more functional. Moreover, the setting of the clinic does not lend itself to an approach adequate for demonstrating the kinds of activities beneficial to the young child's development of language. Here the audiologist or the teacher must necessarily rely on verbally instructing parents. This method offers limited opportunities to observe the types of activities a child needs, and thus a gap is sure to exist between the teacher's description of an activity and the parents' translation of that description into action.

It was to fill this void in service to parents that the Demonstration Home program for parents was initiated, the initial premise being that the very young child with a hearing loss needs immediate and continuing help in order to develop his ability to understand and to utilize appropriate language. The purpose of the project was to help the mother and the father gain insight into their child's hearing problem and how it would affect his development, and to offer guidance in helping the child develop communication skills at home.

Another important goal was to obtain diagnostic information on a continuing basis in these first years of life to determine the child's actual hearing capacity in order to plan for his educational needs in the future and to take early advantage of his hearing potential. Thus, the program for training parents developed from the need to fill the gap between early detection of hearing loss and the preschool educational programs for young deaf children.

The project was based on the premise that this gap requires an innovative approach, which can be handled more judiciously in a parent-oriented home centered environment rather than in the ordinary clinical setting. It was believed the parent would thus be able to translate into positive action those principles of child management which are frequently overlooked or neglected when a diagnosis of deafness has left him paralyzed and immobile from fears, doubt, and uncertainty of the future. The home setting was also considered desirable to provide an environment suggesting to the parents a greater variety of activities that could be incorporated into their home training. Furthermore, because the home activities are more meaningful to the child, they help create in him greater spontaneity. Thus, the child with his parents were brought together in the informal setting of a furnished demonstration home where the teacher helped the parents see the countless ways in which learning can take place in the daily environment. At least once weekly visits were scheduled for most families so that the parents could practice the teaching techniques demonstrated. The role of the teacher of the deaf was to guide the parents in helping the child develop his maximum potential. The four main objectives were:

1. To provide a parent oriented program appropriate to the needs of the very young deaf child.

2. To provide a program in which the skills basic to attainment of language could be practiced on an intensive basis in the child's home.

3. To develop a manual of home teaching techniques to be used for supplementing and facilitating the effective management of the deaf child during his first three years of life.

In essence, this project was considered as the first phase of special education for the deaf child with major emphasis on the instruction of parents as the necessary preliminary to placement in the regular acoustic preschool or in a kindergarten or nursery program for hearing children, depending on the child's capacity to compete in such a situation.

CHAPTER II

METHODS

Description of the Home

The service to deaf children rendered by this project was conceived as a downward extension of the preschool deaf educational program that had been maintained as an ongoing and integral part of the Hearing and Speech Center's service to hearing impaired children since 1952. In the past such children under three seen at the Center for diagnostic evaluation had been placed on an individual diagnostic therapy regime for better evaluation of their prospects for preschool education placement. This type of program was directed towards determining accurate levels of residual hearing and the presence of other factors affecting the child's potential for education. The emphasis, being entirely clinical and focused on various measurements, ignored to a great extent the parents' role and permitted important time to pass before remedial action was begun through placement in the daily preschool, a child-oriented type program.

The home teaching program made possible a much differently oriented service with its greater emphasis on daily life activities as a source of instructional material for development of speech and language skills. A two-story, brick family residence located at the end of the same block in which the Hearing and Speech Center is located was obtained for purposes of this project. The first three months (Feb. - Apr. 1966) were spent in gathering the necessary and essential home furnishings solicited from civic clubs and the local citizenry. The items obtained were attractively refurbished and renovated to furnish a combination kitchen and dining area, living room, bathroom and bedroom. The room opening off the front entrance was used as a reception and waiting room, and adjoining it was an alcove area occupied by the secretary-receptionist.

Procedures for Admission

The procedures for admission to the program were by means of the regular diagnostic evaluation clinics of the Bill Wilkerson Center. The Center has provided for a number of years a twice weekly clinic for all children under six reported to have a serious language problem, either a complete absence of oral language or extremely retarded language development. The large majority of these turn out to be children with peripheral hearing defect or central nervous system damage involving the auditory function. One staff audiologist, for whom 40% time was devoted to this project, did the initial diagnostic work on all children referred to the Home. Once the child had been through the admission process he became the audiologic management problem of the second audiologist, also at 40% time.

Audiologic Evaluation

In keeping with the long-standing medical referral policy of the Center, each child admitted was initially referred to the Center by their pediatrician or family physician. When hearing loss is discovered to be present, the child was seen by an otolaryngologist prior to beginning hearing aid use. Prior to the evaluation, the family filled in a complete case history form which was reviewed at the time of the first visit for further elaboration as indicated.

Hearing was tested by means of both sound field and earphone equipment to include response to monitored live voice, five percent warbled tones for frequencies from 250 through 4,000 Hz, recorded environmental sounds, and white noise. Initially, the child's responses were observed while lying in an infant seat, playing in a high chair, sitting in the mother's lap, or sitting at a small table. If the child could be conditioned to respond voluntarily by means of play audiometry, headphone testing was done. Other tests administered at the time of the initial visit included the Vineland Social Maturity Scale, for which the Preschool Attainment Record was substituted later in the course of the project, and the Communicative Evaluation Chart.

Audiologic Management

One of the important features of this project was the concept that the continuing role of the audiologist is critical in the management of the deaf infant and the very young deaf child. This premise was considered to be vital in that the major goal with each child was directed towards development of the use of audition in the first years of life. The project staff adhered to the philosophy that only when one can come near to simulating the way in which the normal child develops and learns to use spoken language can we expect the most effective results from deprivation of hearing. Thus, the program placed stress on the necessity of early acoustic input. While visual supplement was certainly allowed, it was the belief of the staff that only through a selective and orderly process of associating sound and meaning can a child learn to make optimum use of his hearing residuum, however minimal. It was therefore considered important that audiologic management play a vital and significant role in close coordination with the teaching to make possible an orderly and ongoing audiologic schedule which would insure the results with wearable amplification to meet the project's objectives for each child, if at all possible.

Following the first examination in the Language Clinic, the audiologist counseled the parents concerning the child's performance on the various assessments used, including hearing as well as social maturity and language skills. The ramifications of hearing loss for the child's development were discussed and the need for immediate remedial steps was emphasized. The parents were then scheduled for a second examination within approximately one week and no later than ten days, in which the first audiologic test results were confirmed through retesting and the parents were again counseled. It became apparent that parents do not retain or understand information given at the initial visit when they are often too emotionally upset to hear what is being said. After having tried to assimilate what they were told for several days, they return with many more questions than they were able to verbalize at the first visit. In instances where only the mother accompanied the child on the first visit, the father was required to come with the mother and child for the second or a subsequent visit before a child could be considered for the program. In other words, it was believed that both parents had to be familiar with the nature of the program and its implied responsibilities for them.

At the second audiologic visit the schedule was arranged to make possible the parents' first visit to the Demonstration Home where they were introduced to the teachers and shown the facilities. On this second visit they were also seen by the staff social worker who evaluated the feasibility of their participation in the Home program from the standpoint of their general attitude. Evaluation of the dynamics of the family and home situation in relation to factors which would ensure attendance and influence the child's progress was done. Following the second audiologic visit, the project staff in their weekly conference reviewed the case and made a decision whether to enroll the child in the Home program.

The family was then scheduled for their first regular Home visit and a third audiologic visit was scheduled to coincide with the teaching session at the Home. The teacher and the audiologist established from the first a vehicle to coordinate their findings and observations, thus avoiding confusion on the part of the family. This close coordination was invaluable in assisting the parents to accept their child's problem and to digest and retain the necessary information given them by various members of the staff. On the third examination, the parents were asked to review what had been told them on their first two audiologic visits. It was not infrequent that parents gave information inconsistent with the facts, showing that families cannot easily absorb and integrate at an intellectual level information given them regarding their handicapped child. At this visit the audiogram was again reviewed and explained emphasizing the importance of capitalizing on any residual hearing through wearable hearing aid use at the earliest possible time. Although the uppermost question in the parent's mind most often regards educational placement, the audiologist deferred specific recommendations at this point, urging they begin immediately to help prepare their child for the best possible educational placement later on. Various types of educational programs were reviewed, relating these to factors which determine what kind of hearing impaired child their child might turn out to be.

At this visit the wearable hearing aid was introduced with some explanation of its anticipated benefits. It had to be pointed out that the child would not be able to "understand" even though he would "hear" when first beginning hearing aid use. The way the normal child learns to talk was reviewed, emphasizing that hearing others talk occurs for a full year before the normal child produces his first words. Efforts were concentrated on helping the parents take a realistic view towards their child's hearing problem.

The hearing aid was next introduced to the child himself, and through demonstrating and by listening through the hearing aid first, the audiologist showed excitement and surprise, repeating the activity with the child. The child is given an opportunity to react similarly and also to handle the hearing aid and the receiver that went into his ear. Then he was encouraged to put it back on and listen again. Utmost patience was required together with a working knowledge of early child development in getting the child to recognize that the hearing aid was not something of which to be frightened. Usually, the audiologist was successful in getting him to tolerate it in his ear for a few minutes on the first attempt. In the case of the younger child (infants eighteen months and under) the earmold could be made and the hearing aid placed on him almost immediately. The young child also was often more demonstrative at hearing for the first time through the hearing aid.

Goals were set for the family in terms of definite lengths of time for which their child should wear the hearing aid. The more relaxed parents who had greater self-confidence were asked to increase the span of time from three times a day in a given week to wearing the instrument three-fourths of his waking hours. The less secure parents were instructed to increase their child's wearing the aid to one hour three times a day in one week. If the child resisted the earmold, the parents were instructed to let him wear the instrument without volume for at least a day before producing any loudness. A very low volume setting was used until the audiologist had had an opportunity to observe the child wearing the instrument. The first week might well be spent in getting him to tolerate the harness and the instrument without its being turned on at all.

After the child learned to tolerate the newly introduced hearing aid, the audiologist then investigated the resultant improvement with amplification by repeating sound field tests that were administered first to the child without the hearing aid. If the child did not respond to the amplification, it was emphasized to the parents that only through intensive efforts directed at improvement in listening skills could the child be expected to make use of this new kind of hearing. Earmolds were made for both ears on the basis that most children would be fitted with binaural hearing aids whenever possible, the philosophy being that binaural hearing more accurately simulates the hearing experiences of normal children.

The next audiologic visit a week later concerned with the new loaner hearing aid that the family would take home. Through the project funding new loaner hearing aids thought suitable for young deaf children were purchased each year. This feature of the project was extremely valuable in that it allowed wearable hearing aid use to begin almost immediately after the child was accepted. Delays of a matter of weeks in starting hearing aid use can be crucial. When one has to make a recommendation to a family to purchase the hearing aid, the risk of investment in an unsuitable hearing aid is high. Thus, frequent testing and trial use of hearing aids at home are essential in order to make a judicious selection of an aid. The audiologist selected a loaner aid of the proper gain characteristics; the parents were instructed regarding battery insertion, volume and tone control switches, earmold insertion, the cord attachment and the complete assembly of the hearing aid. Mimeographed information entitled "Guidelines for Hearing Aid Management" (Appendix A) was given them to refresh their memory at home. The audiologist then put the hearing aid on the child, played with him for a few minutes and then took it off. The parent was then asked to put the instrument on the child, and if unsuccessful, the audiologist suggested ways to handle the situation more effectively. Testing for selected aided thresholds was often repeated at this time, as it was on each visit.

At the next audiology visit it was found parents had many questions to ask concerning the hearing aid, the earmold and the child's behavior when wearing the aid. The audiologist found a way to suggest encouragement to the parents, no matter how difficult a time they may have had. At this time the audiologist told the parents that within a month she would expect their child to be wearing the hearing aid all day, every day except for his nap or bath. Parents who had difficulty accepting amplification for their child would often require additional counseling. Since the child's behavior with amplification in the home was an important consideration in the hearing aid selection procedure, the parents had to be trained by the audiologist and teachers to become good observers of auditory function.

After the child had adjusted to daily hearing aid use, the volume was increased until an appropriate level could be found. Often the audiologist preferred to use a level just below the point where feedback occurred to get maximum benefit, but a hearing aid was never used at full volume. Each child was then tested on a weekly basis until his own permanent hearing aid was recommended.

The foregoing procedure for selection of a permanent aid required an average of four months for each child. Weekly test sessions provided a continuing reminder for the child to listen and for the parents to observe. Comparative tests were done with various hearing aids in the loaner stock as well as in the clinic stock itself until the hearing aid that seemed to be giving the most reasonable kind of assistance that could be expected had been selected. Hearing aids were provided for the medically indigent children through the State Crippled Children's Service program. In some instances when it was deemed important that the child have two hearing aids, the audiologist and the social worker sought assistance from civic and church groups to purchase the second aid, which was not authorized by the State.

The use of loaner hearing aids proved an invaluable tool as suggested previously. It enabled each child to have the benefit of immediate auditory stimulation regardless of the financial status of the family. The audiologist did not feel compelled to recommend a permanent instrument hastily when the child was already having opportunity to adjust to and benefit from a hearing aid in stock. It gave the audiologist more time to evaluate available instruments and to determine the more suitable one for the child. Testing methods and results for very young children are somewhat unreliable at best, and the value of repeated measurement and observation on a periodic basis cannot be overstated. It also enabled the audiologist to educate the family about hearing aids, their manipulation and care, their limitations and assets, and what can realistically be expected.

When the audiologist had narrowed the number of hearing aids to two or three possible choices, the following criteria were considered before making a final recommendation:

1. Financial situation of the family.
2. Availability of service for the instrument in their area of residence.
3. Reputation of the hearing aid dealer.

It was considered vital to have the father present when the recommendation for the permanent hearing aid was given. Since the father's attitude may be very important regarding the purchase of the aid, it was deemed important that the breadwinner be present to know and have explained to him how the various aids had been examined with his child and why a particular instrument was being recommended.

Parents were instructed to return immediately after they purchased their permanent aid or aids for checking its performance. New earmolds were often made at this time to alleviate feedback problems that sometimes occurred. For children under two, audiologic examinations were then scheduled on a monthly basis to follow their development of auditory awareness and verbal communication. Hearing level was evaluated at these visits as well as the results with hearing aids. By two to two and one-half years of age, follow-up examinations were scheduled at three months intervals. By this time it was expected that the parent's comprehension of the child's audiogram, its implications for hearing aid use, auditory behavior, language development and educational potential would have been achieved. At age three those children living sufficiently near the Center were enrolled in a preschool acoustic nursery program at the Center and were often then discontinued from the Home program. All children who had once been in the project, however, remained under the continuing care of the audiologist in order to ensure that each child's use of audition was being monitored.

In order to disseminate information on the total audiologic program, the audiologist prepared an outline of procedures which was distributed to each staff member. A copy of this procedure outline may be found in Appendix A. Likewise, some of the many questions parents asked and ways in which the audiologist attempted to guide them are found in Appendix A.

Parent Teaching Procedures

The foregoing sections have dealt with the physical environment, admission procedures, and audiologic handling, each of which played an unique role but all of which are basically secondary to the major thrust -- teaching the parents to assume the primary responsibility for guiding their handicapped child to develop the language which is the key so vital to learning and personal-social adjustment.

The program was designed to teach parents how the commonplace and daily activities of the home can be utilized and adapted to maximize the auditory, language and speech development of their deaf children. It did not attempt to make the parents "teachers of the deaf," but rather aimed at helping them capitalize on their natural way of interacting with their children to stimulate the development of comprehension and expression of aural-oral language in the critical early months and years of development. The intent from the outset was to develop a systematic, natural and workable methodology for parents of very young deaf children to implement in their home settings, and further, to translate this methodology into a manual which would not only be a guide for future parents of young hearing impaired children, but also to professionals interested in the development of similar kinds of programs. This manual is still in a state of ongoing revision and change, but ultimately is expected to set forth in detail the kinds of specific methods and the sequence of these methods in the management of deaf children under three. The manual represents a presentation of methodology in depth; the present report will attempt only to summarize the teaching procedures by discussing the specific goals of the program and some of the major principles which emerged during the progress of the project.

Teaching objectives

1. To orient the parents to a more insightful analysis of their own auditory environments and through the parents to orient their hearing impaired children to their world of sounds.

In this regard the parents were given specific instructions that would enable them:

- a. to select sounds to which to call their child's attention;
- b. to respond visibly and appropriately to the occurrence of these sounds, thereby stimulating the child's response;
- c. to associate consistently all sounds and their sources;
- d. to gain an appreciation for the need for repetition in the occurrence of the sounds selected, and for the need for consistency in responding to their child's reactions to these sounds in a manner to provide positive reinforcement;

e. to understand the need for, and the techniques through, which listening to and responding to sound can be made fun for the child.

2. To assist the parents in helping their children make a successful adjustment to daily, full-time use of individual hearing-aids, preferably binaural.

3. To teach parents how best to talk to their hearing impaired children by developing their skills in the following practices:

a. consistent and appropriate use of short, simple sentences and phrases;
b. talking about the "here and now";
c. talking on subjects that have demonstrable referents which have high interest value and meaning to the child;
d. talking close to the child and directly into the microphone(s) of his hearing aid(s);
e. use of consistent, meaningful and somewhat exaggerated patterns of inflection and intonation;
f. capitalizing on all "talking times" and creating opportunities for "talking times" in everyday activities;
g. expansion of the child's speech utterances through consistent feedback in order to stimulate syntactical and morphological growth;
h. talking at the child's ear and eye level.

4. To familiarize parents with the principles, stages and sequence of normal language and speech acquisition and to apply this frame of reference in their stimulation of language and speech development and in setting expectations for their hearing impaired children. The following principles were stressed and served as guidelines in helping the parents help their own children:

a. language is best and most readily learned when it has an experiential basis, when it grows out of the child's daily activities and experiences, thus having maximum meaning to him;
b. language and speech is most readily learned and generalized when it is a mediator of environment change - a child's learning of language and speech and his use of it occurs only if and when he sees that it makes something happen, *i.e.*, when he sees that he can control his own environment through his use of words;
c. in the normal developmental sequence language input in great quantity and variety precedes language output; thus the emphasis early in the hearing impaired child's life must be on maximizing the quantity and quality of auditory-verbal input and not on requiring speech except positively to reinforce all vocal and verbal behavior;
d. the structure patterns of intonations and vocabulary of language interact and each exert a significant effect as conveyors of meaning; thus all three aspects must be considered in helping the hearing impaired child develop in his language skills.

Principles of parent teaching developed from the project

Relation between parents and teacher. The successful implementation of such a program as has been described requires an environment - both psychological and physical - in which communication between the teachers and the parents can flourish without any of the barriers common in clinical and more formal pedagogical settings. The validity of this observation was demonstrated repeatedly during the three year demonstration period. It was found mandatory to use every opportunity to create an informal and open environment. The model home had to seem like a real home with comfortable and not-so-new furniture, where the parents, children and teachers could wear informal and very comfortable clothing and where they could talk without hesitation about anything they wished. The project required a physical and psychological environment in which parents felt free to learn, to practice and to be constructively criticized and self-critical.

Scheduling practices. At the outset of the program families were scheduled for visits to the Home as intensively as distance and other factors would permit. Local families were often scheduled twice per week for individual appointments, in addition to a monthly group session of all the parents. This latter meeting was divided into two sections: one designed to present information to the parents and which was conducted by the staff of the project supplemented by guest speakers; the second aspect of the meeting was intended to provide an opportunity for the parents to discuss child rearing practices, attitudes toward their children, family dynamics, etc. and was conducted by two consultant psychologists. This scheduling plan was based on the assumption that the more frequently one could have contact with the parents the better. Experience demonstrated, however, that intensive scheduling tended to promote an overdependence of the parents on the teacher and program and acted as a deterrent to the parents' assuming an increasing amount of responsibility for actively working with their children. The policy was thus revised to allow for a maximum of one individual visit per week for each family with a teacher. The monthly group meetings of parents was continued.

Scheduling practices evolved by the end of the project and being continued in the service program at the present time to include three visits per month for each family: one session of parents, child and teacher for an hour and a half in length; one two hour visit of all parents without their children; and one visit consisting of a very small group at most (three or four sets of parents). This latter grouping practice was adopted because of the help that parents can often be to each other and because of the varying specific needs of the families. The parents comprising these small groups are varied frequently, and are determined by the common needs of the various families.

CHAPTER III

FINDINGS AND ANALYSIS

The Population

A total of 94 deaf children were seen for home teaching services during the course of this project. Data regarding sex and race ratios are presented in Table 1, along with the figures on the amount of home instruction received.

Table 1. Summary of individual data on 94 subjects by sex, race, and amount instruction.

	Sex		Race	
Males	57	(60.6%)	Caucasians	93
Females	37	(39.4%)	Negroes	1
	94			94

Instruction	
Mean age at beginning instruction	28.8 mo. Range 4 mo. - 66 mo.
No. beginning instruction 0 - 12 mo.	5
No. beginning instruction 13 - 24 mo.	27
No. beginning instruction 25 - 36 mo.	40
No. beginning instruction 37 - 48 mo.	18
No. beginning instruction 49 - 60 mo.	3
No. beginning instruction over 60 mo. age	1
	94
Mean length of home training per family	8.1 mo. Range 0.3 - 2.8 mo.
Mean no. home training sessions	13.9
Mean no. absences	3.1
Mean total hr. home instruction	18.3 hr. Range 2.3 - 68.5 hr.

Of the 94 children, 72 were under three years of age at the time of the initial visit. It may be recalled that in the application the emphasis was to be on children under three, but also it was stated that services would not be limited to these children if preschool children over three required such home instruction by virtue of not having had access to any other kind of program previously. As a result, the project included one child as old as five years six months who was in the program in conjunction with placement in the preschool kindergarten at the Hearing and Speech Center. The home management problems in this instance were sufficiently serious to warrant the two kinds of placement simultaneously.

A breakdown of the children by year age span, also shown in Table 1, shows that more than two-thirds (67) were between one and three years of age, the mean being about two years four months. Data are also presented on the average number of months of home training per family, together with absences, number of sessions, and the mean number of total hours of home instruction.

The mother was by far the family member attending the greatest number of training sessions, as well as being the one most consistent family member contact, as would be anticipated. It was of interest, however, that other members of the family did attend, and for one child it may be noted that the grandfather was the most consistent person to attend the teaching sessions (see Table 2). In this instance the

Table 2. Family participation data on 94 subjects

Family Participants	
Mean no. home visits attended by mother	12.8
Mean no. home visits attended by father	4.0
Mean no. home visits attended by grandfather	0.7
Mean no. home visits attended by grandmother	1.6
Mean no. home visits attended by others	3.1

Most Consistent Family Member Receiving Instruction	
Mother only	71
Both mother and father	13
Mother and grandmother	2
Mother and aunt	1
Mother and maid	1
Foster mother	1
Grandmother only	2
Both grandmother and grandfather	1
Grandfather only	1
Sister	1
	94

grandparents kept the child and the grandmother worked. The important factor here was that the person responsible for the child in the home was the one who was always encouraged to attend the training sessions, if at all possible. Thus, families were encouraged to participate even if employment of the mother did prevent her from coming. It was also gratifying that for 13 of the 94 children, both mother and father attended most sessions. This type of commitment on the part of both parents was considered most important, although it must be recognized that economic circumstances would prevent many fathers from attending even though they shared the same commitment for their child.

Table 3 gives information on the 94 subjects from the standpoint of residence. It will be noted that almost three-fourths were from Tennessee, with about one in four coming from three adjoining states and two more distant ones. Excluding Tennessee, Kentucky sent the next largest number. Metropolitan Nashville and Davidson County with a population of nearly 500,000 provided 34 or one-half of those from Tennessee, with the remaining 34 from other Tennessee counties. Because of the long distances some

Table 3. Subjects classified by residence.

Tennessee		68	
Metropolitan Nashville and Davidson Co.	34		
Other Tennessee Counties	34		
Kentucky		17	
Alabama		4	
Mississippi		3	
Illinois		1	
Ohio		1	
Total			94
Percent from Tennessee		72%	
Percent from other states		28%	
			100%
Percent from rural homes (30)		32%	
Percent from urban homes (64)		68%	
			100%

individuals traveled, the mean number of miles that a family traveled for a session was 64.7 miles, which in itself indicates considerable sacrifice on the part of these families. Even within the county the shortest distance reported for any family was three miles, while the furthest distance was 550 miles. The latter instance was a Mississippi family which made eight training visits. Nineteen, or about one in five, were required to travel distances one way of 100 miles or more. The fact that these families traveled this distance to obtain this service is indicative of the need for such services on a state-wide basis for children throughout the preschool period. It is impossible for every rural county to have a formal preschool program for deaf children, yet some means of assistance and guidance to the families of deaf children is necessary. Thus, it was very apparent the home training program provided an important service in areas where so little help at this period in the deaf child's life was available.

The families of these children were studied from several other points of view, among which were the age and education characteristics of the parents, shown in Table 4. The ranges given show how diversified the parents were in age as well as in educational status.

Table 4. Summary data on age and education of parents.

Parent	N	Mn. Age	Range	Mn. Yr. Educ.	Range
Fathers	92	30.2 yr.	20 - 58 yr.	11.7 yr.	5th grade - Ph.D.
Mothers	94	26.8 yr.	16 - 50 yr.	11.7 yr.	5th grade - Master's

It is of interest further to note from Table 5 that 85% of the 94 children were living in homes with both parents. The higher incidence of broken homes that is often reported to characterize the families of handicapped children was not as apparent in this group, but it must be recalled that the children themselves are in a younger age range than is normally reported. It is perhaps thus too soon to predict if the effects of the handicap will be shown in a larger number of broken homes at a later time for these children. Almost two of five were in families in which the deaf child was the only child. These were in most cases the younger families.

Income status is shown in Table 6 for 76 families for which information was available. A wide spread here is also noted, although more than 50% were under $6,000. Thus, a large number would fall in or near the poverty classification, and would be unable to pay for the much needed services in a critical period of their child's life. It points up perhaps most of all that if we expect to capitalize on audition in the learning process through binaural hearing aids, there will have to be subsidization by some government agency for this purpose.

Table 5. Personal data on homes and families of the subjects.

Family status	N		Percent	
Living with both parents	80		85.1	
Living with a divorced, separated, or unwed parent	11		11.7	
Living with other relatives	2		2.1	
Illegitimate child in foster home	1		1.1	
		94		100%
From one child family	37		39.4	
From home with siblings	57		60.6	
		94		100%
Mean number siblings in 57 families		2.2		
From homes in which one or more members other than immediate family	5		5.3	
From homes with employed mothers	30		31.9	

Finally, it was of interest to view this population with respect to the etiology of the hearing impairment. The cause could not be determined in 19 instances. For the remainder of the population (75 children), the most prevalent etiology was maternal rubella, which accounted for 39 cases. The other causes in order of incidence were: heredity, 14; infectious diseases in infancy, 8; drug toxicity, 7; and prematurity and anoxia at birth, 7.

Table 6. Income status for subjects' families (N - 76)

Income Range	N	Percent
Under $2000	1	1.3
$2000 - 3999	19	25.0
$4000 - 5999	23	30.3
$6000 - 7999	14	18.4
$8000 - 9999	11	14.5
Over $10,000	8	10.5
	76	100.0

Results of Hearing Measurements

The importance of the first year of life to the child's learning of language cannot be overestimated. The hearing child in this period is storing up auditory images months before he begins to give meaningful vocalizations himself. It has long been known that the deaf child will experience the same kind of vocalization pattern in the first six months of life that the hearing child does. In other words, this initial vocal output is generally reflexive in nature. In the second six months, however, the role of conscious monitoring through auditory feedback becomes increasingly operative, so that the child who is not hearing his own vocal output tends to cease this type of activity and vocalization steadily diminishes. Most of these children at one year have become silent children except for the reflexive sounds associated with feelings and emotion.

On the basis of the importance of these critical first years, the present project has endeavored to provide each child with a wearable hearing aid as soon as possible to bring into play the function of audition. A hearing aid was recommended in most instances within the first month, and usually by the fourth audiologic visit. Even those showing little response to sound were fitted with instruments on the basis that they might be able to receive some early auditory reinforcement from babbling and vocal play, which might thus stimulate fragmentary hearing not previously detected. The object was not to deprive any child of the privilege of auditory stimulation, regardless of his ability to respond to test stimuli. There is an abundance of past experience with deaf children which demonstrates what the product is when no acoustic stimulation is provided until six years of age. What is needed is far more data on what can happen if all deaf youngsters receive intensive acoustic stimulation from infancy throughout the preschool period.

Severity of hearing loss

Of the 94 children enrolled in the project, 78 were under three years of age at the time of their first examination. The mean age for the under three's at first visit was 23.1 months with a range from one month to two years 11 months. The mean audiometric results for these 78 children for both pure tones and complex stimuli are shown in Figure 1. Table 7 presents similar information including both sound field and earphone measurements for the entire 94 subjects, 16 of whom were older than three at first visit. Comparison of the hearing test results for the under three's in Figure 1 with that of the total group of 94 in Table 7 shows mean levels were virtually the same, whether including those older than three or excluding them.

It may be noted that responses to complex stimuli were considerably better than for pure tones. The young child finds it easier to attend to and respond to a complex sound stimulus, the pure tone being a very discreet and unnatural kind of sound requiring greater intensity above threshold to catch his attention. In considering the severity indicated

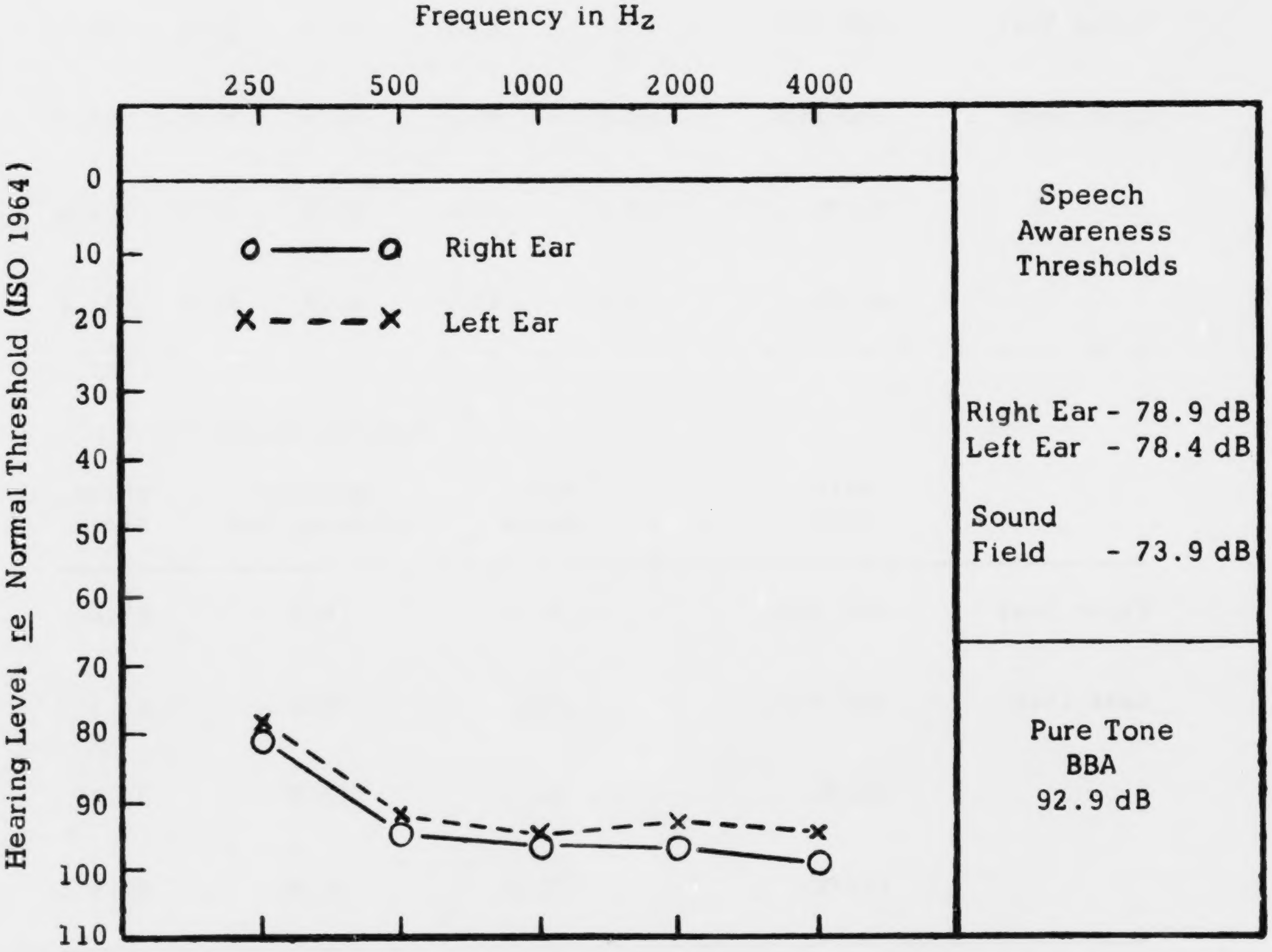

Figure 1. Summary of mean monaural thresholds for pure tones and mean speech awareness thresholds for the 78 subjects under three at initial examination.

Table 7. Summary of mean thresholds in dB (43 1964 ISO) at first and last test for 94 subjects.

	Meth. Pres.	Pure tone frequencies 250	500	1000	2000	4000
First Test	Snd Fld.	83.3	95.9	96.5	96.5	97.1
Last Test	Snd Fld.	81.9	92.4	93.9	94.6	95.9
	RE-Ph.	81.2	93.4	95.3	97.2	99.8
	LE-Ph.	79.4	92.6	94.9	94.4	91.6

	Meth. Pres.	Complex sounds Spch Aware	Recorded Environ. Snd	White Noise
First Test	Snd Fld.	73.9	74.7	85.6
Last Test	Snd Fld.	72.8	74.1	87.1
	RE-Ph.	80.1	77.9	92.7
	LE-Ph.	79.4	74.0	87.1

by the pure tone levels in Table 7, one must take into account that the mean awareness threshold for speech was at least 10 dB better than the best threshold for any of the pure tones. This finding further confirms that the hearing levels for pure tones in young children tend to be depressed to a level poorer than actual threshold.

Frequency of audiologic visits

The audiologic program in this project was originally conceived to be quite intensive, with a greater amount of audiologic time in proportion to teacher time than children in educational programs normally would receive. The foregoing section on Methods provided detailed explanation of the series of audiologic visits which occurred after the initial exam until the child was fitted with his own wearable hearing aid. The guidance of the parents in the first days of hearing aid use for the very young child requires much more frequent visits and testing to assure successful hearing aid use. The audiologist, therefore, bears an important responsibility in any educational program which purports to stress the value of acoustic input in these first years.

Table 8 gives a summary of the number of audiologic visits per child for the 78 children under three, who are categorized by age span groups designating the first, second and third years of life. Each child was seen, on the average, for about 14 - 15 test sessions while in the project. Thus, these children were seen at least about every two weeks during the period of instruction.

Table 8. Summary of number audiologic visits per child for 78 subjects under three.

Age Group	N	Total No. Unaided Test Sessions	Mean No. Test Sessions Per Child	Total No. Aided Test Sessions	Mean No. Test Sessions Per Child
0 - 1 yr.	10	91	9.1	146	14.6
1 - 2 yr.	29	243	8.4	435	15.5
2 - 3 yr.	39	318	8.2	571	14.6
Combined under three's	78	652	8.3	115.2	14.9

The thoroughness of audiologic handling for the total 94 children can be viewed from another standpoint in Table 9, which shows the mean number of tests at each test signal (including both pure tones and complex sounds) for each child, both aided and unaided. This information is further categorized by method of presentation, whether sound field or monaural. When the various presentation methods are summed at each stimulus, the mean number of tests per signal (including both aided and unaided presentations) ranges from a high of 24.2 tests for speech awareness level, with the minimum mean number of tests being 9.2 for recorded sounds. Pure tones in the speech frequency range (500, 1000, and 2000 Hz) were those ranking next to speech in number of tests per child.

In order to evaluate the test-retest reliability of the responses of these children under three, all responses for a given child were

Table 9. Summary of mean number tests per test signal for 94 subjects. (Numbers in parentheses indicate upper range for number of tests given at each signal.)

Meth. Presentation	Pure tone frequency				
	250	500	1000	2000	4000
			Mean no. tests per signal (unaided)		
SF	2.0 (7)	2.6	2.6 (7)	2.4 (8)	2.1 (7)
RE-Ph.	3.5 (9)	4.4	4.1 (12)	4.0 (11)	3.4 (10)
LE-Ph.	3.6 (11)	4.3	4.3 (13)	4.0 (12)	3.4 (11)
			Mean no. tests per signal (aided)		
SF	3.7 (10)	9.4 (29)	9.7 (31)	8.8 (27)	5.7 (13)
Total per Stimulus	12.8	20.7	20.7	19.2	14.6

	Complex Sounds		
	Spch	Record	Noise
	3.7 (9)	2.5 (7)	2.4 (7)
	3.9 (14)	1.4 (3)	2.1 (7)
	3.9 (11)	1.4 (3)	2.1 (7)
Total Per Stimulus	24.2	9.2	13.5

summed by test signals, the mean was computed, and then each separate response was compared to that child's mean for that signal. This computation revealed that more than 90% of all responses of a particular child were within plus or minus 15 dB of his mean. More than 50% were within five dB or at the mean. These findings would certainly suggest that one may consider a 15 dB variation between tests a quite acceptable margin from test to test for this age group. The fact that about 10% of the responses were 20 dB or more from the mean, however, further points out that the necessity of repeated measurements, since it is unlikely that such results indicate actual threshold shifts.

Comparison of hearing levels for two subgroups

The children's responses to threshold testing were further studied in relation to any differences obtaining between active and inactive groups. In other words, those children who remained active in the project were compared with those who were inactive on the assumption that the inactive subjects were not as good candidates for amplification or for home instruction as those who remained active. Such a premise is not necessarily valid in view of the fact that some inactive subjects were inactive merely because they entered at the beginning of the project when they were almost three years old, and were thus soon placed in a nursery or kindergarten placement here or elsewhere. Some few were discontinued because their prognosis for help was poor (irregular attendance being a major determinant), and some on continuing evaluation proved to have problems other than hearing impairment. In any case, Tables 10 and 11 show the mean differences between first and last visits with statistical significance levels for both the active and inactive groups. In each instance the differences were toward improvement in threshold at last visit, although many of these were minimal, particularly for the unaided thresholds. It is not anticipated that such shifts in thresholds actually improved mean hearing levels; rather, these kinds of differential responses are attributed to the effects of practice and improvement in "testability", resulting both from practice and training, to make them more responsive to their auditory environment.

Figures 2 and 3, which present this same information graphically, showed somewhat greater shift in aided thresholds for the active subjects compared to inactives, but less shift in the unaided thresholds. The active-inactive comparison in general did not yield differences that could be considered meaningful.

Use of Hearing Aids

The emphasis on acoustic input for the child from as early an age as possible required flexibility in the management of hearing aids to an extent not usually feasible for adults and older children with established language patterns. The audiologist, therefore, must orient himself to a different kind of role if he intends to meet the needs of the infant in this respect. The children in this project wore various loaner hearing aids for an average period of 4.8 months (range, 1 week to 32 months) before their own permanent aid or aids were obtained. While wearing the loaner hearing aids, the children were undergoing audiologic tests routinely and frequently with various loan aids from the loaner stock. The parents were guided in making observations of the child's response to sound at home while wearing these various aids. Strong gain instruments were used only when the results of several audiologic examinations substantiated that a moderately severe to severe hearing impairment existed.

Although the literature has not provided definitive information on the objective measurement of improvement with binaural hearing aids

Table 10. Summary comparison of first and last thresholds in dB for pure tones and complex sounds for those subjects active in the project. (The first value for each signal represents the unaided threshold, the one below the aided threshold.)

Test Signal	N	First Mn Thr	Last Mn Thr	Mn D	_t_ Score	P
250 Hz	36	87.9	84.2	3.7	1.706	>.05
	14	74.6	62.9	11.7	2.958	<.05*
500 Hz	44	96.8	92.5	4.3	1.662	>.05
	43	70.2	55.0	15.2	5.267	<.01*
1000 Hz	44	100.5	96.1	4.4	2.060	<.05*
	41	64.7	51.8	12.9	4.463	<.01*
2000 Hz	42	97.0	96.5	0.5	0.240	>.05
	36	67.6	53.7	13.9	4.209	<.01*
4000 Hz	32	97.8	97.3	0.5	0.211	>.05
	21	78.5	64.9	13.06	2.754	<.05*
Live Voice	46	82.8	82.5	0.3	0.139	>.05
	50	52.4	39.1	13.3	6.711	<.01*
Recorded Environ. Sound	19	92.6	88.9	3.7	1.072	>.05
	7	72.1	48.6	23.5	2.869	<.05*
Complex Noise	38	93.4	92.9	0.5	0.167	>.05
	29	69.1	61.2	7.9	2.241	<.05*

*Statistically significant

Table 11. Summary comparison of first and last thresholds in dB for pure tones and complex sounds for those subjects not active in the project. (The first value for each signal represents the unaided threshold, the one below the aided threshold.)

Test Signal	N	First Mn Thr	Last Mn Thr	Mn D	*t* Score	P
250 Hz	15	83.9	78.0	4.9	1.055	>.05
	No subject tested at both first and last visit					
500 Hz	17	98.8	87.0	11.8	2.682	<.05*
	7	67.6	61.3	6.3	0.835	>.05
1000 Hz	16	95.9	85.9	9.9	2.172	<.05*
	7	67.1	57.9	9.2	2.241	>.05
2000 Hz	13	99.7	85.5	14.2	3.107	<.01*
	6	60.7	51.5	9.2	1.282	>.05
4000 Hz	11	96.0	91.2	4.8	1.014	>.05
	2	100.5	87.5	13.0	0.765	>.05
Live Voice	20	86.5	79.5	7.0	2.351	<.05*
	14	55.4	47.9	7.5	0.901	>.05
Recorded Environ. Sound	16	87.8	78.8	9.1	1.935	>.05
	5	56.0	51.0	5.0	0.349	>.05
Complex Noise	9	92.8	90.0	2.8	0.315	>.05
	4	77.5	62.5	15.0	1.414	>.05

*Statistically significant

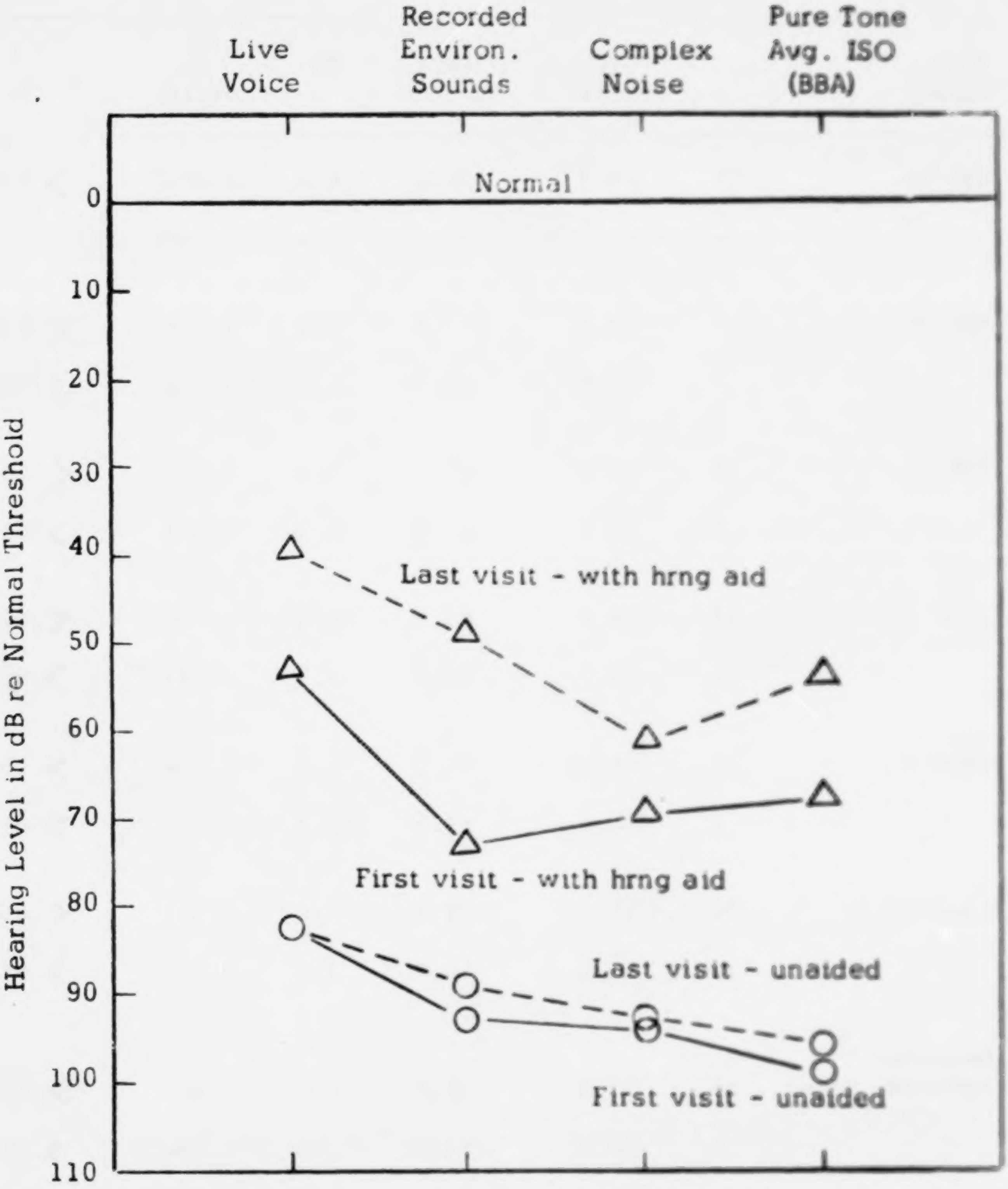

Figure 2. Comparison of mean thresholds, aided and unaided, for pure tone and complex stimuli at first and last visits (Active Group).

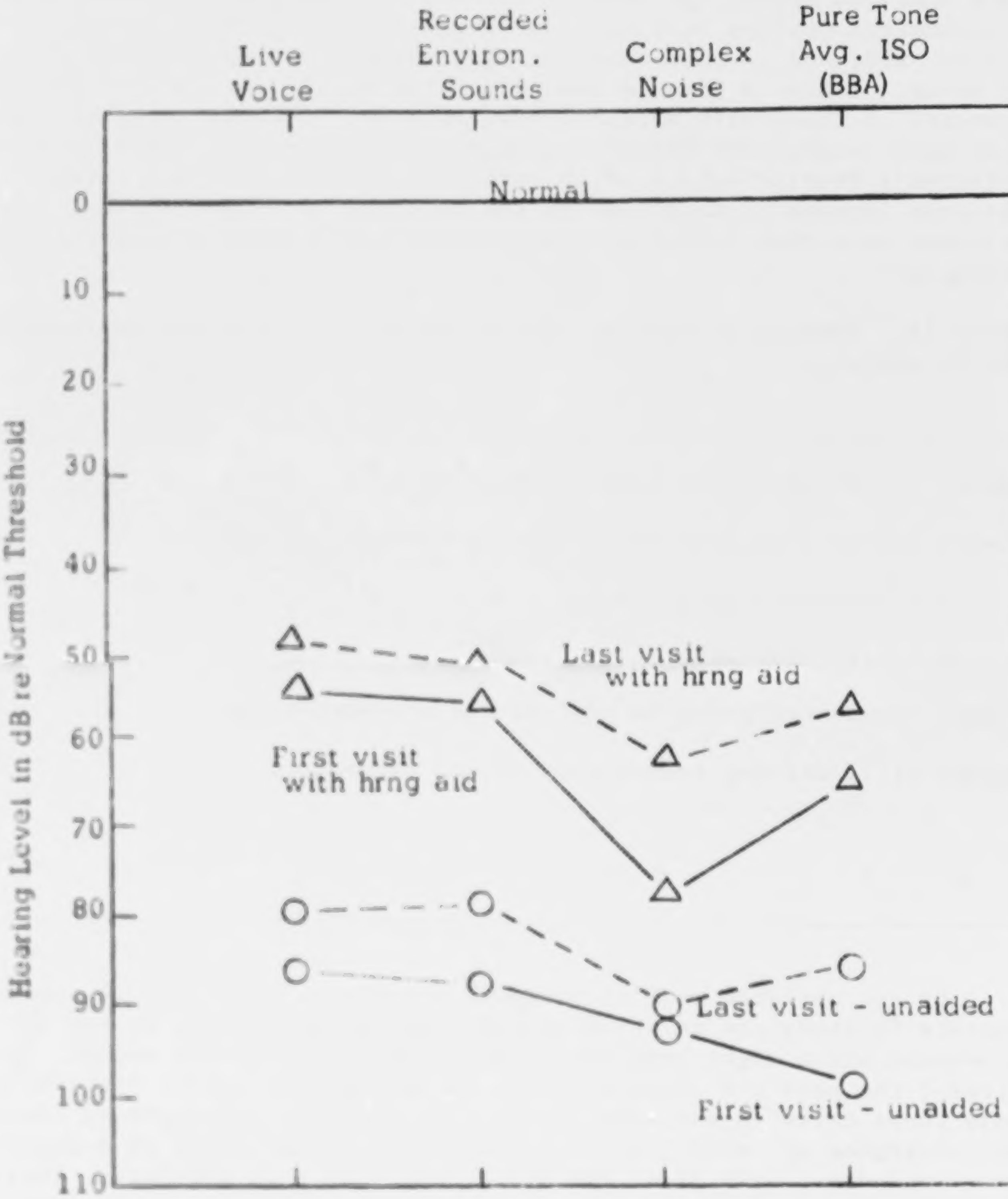

Figure 3. Comparison of mean thresholds, aided and unaided, for pure tone and complex stimuli at first and last visits (Inactive Group).

compared to monaural, the children in the present project were fitted with binaural aids whenever possible. Furthermore, much of the work reported has been for results obtained with adults, while very little has been done with young children. Luterman and Tennican[1] reported at the 1968 American Speech and Hearing Association Convention that 18 deaf preschoolers wearing hearing aids were observed by their parents to prefer two aids and to show superior performance at home in their reactions to sound. Table 12 gives a summary of the number fitted with binaural compared to those with monaural hearing aids. Although binaural hearing aids were recommended whenever possible, the Tennessee State Crippled Children's Service agency which purchased hearing aids for indigent children imposed restrictions on the purchase of binaural aids. These children were thus fitted with a monaural aid despite a binaural recommendation.

Table 12. Summary of hearing aid recommendations and dispositions for the 94 subjects.

Number fitted with true binaural hearing aids	45
Number fitted with binaural reception through use of two receivers on Y - cord	4
Number fitted with monaural hearing aids	24
Number terminated prior to hearing aid recommendation	13
Number still wearing loaner aids at end of project	8
Total	94

Of the children wearing binaural hearing aids, it was of interest further to study the relation of the time in the project to any improvement which might have occurred in their response to sound. In view of the need for repeated tests to insure test-retest reliability, only those children who were fitted with binaural hearing aids and who had undergone at least ten testing sessions using speech as a signal were included. Only 11 of the group fell into this category. Their first five response levels to speech were compared with their last five, both without and with the hearing aid.

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1. Luterman, D., and Tennican, C. Binaural hearing aids for deaf preschool children. Paper read at Annual Convention, American Speech and Hearing Association, Denver, Colorado, November 1968.

Binaural hearing aids had been worn for a mean of 22 months by these 11 subjects. Mean unaided thresholds progressed from 65.6 dB hearing level for speech to 67.5 dB for the last five tests, indicating a slightly poorer level. Application of the Sign Test[1] showed this difference not to be statistically significant. With their hearing aids the mean of their first five tests improved from a speech awareness level of 35 dB to a mean of 24.5 dB for their last five tests. The Sign Test showed this substantial difference to be significant at less than $p : < .001$. This finding confirmed our hypothesis that the first trial with a hearing aid cannot be expected to yield a maximal result with very young deaf children. Parents must be counseled not to expect too much from the child in the first weeks of hearing aid use. It was observed that after learning to use the hearing aid the child adapts his listening habits accordingly. In other words, like the hearing person, he begins to separate background from foreground and to attend appropriately. It was common to see these children take on a listening attitude when their hearing aid was put on them and turned on. As soon as the hearing aid was removed, they would stop listening completely.

The effect of auditory stimulation for one young child was made dramatically apparent in a public demonstration. A two-year old child, while wearing her hearing aids, vocalized and jabbered as she played with objects on the table and appeared to be attempting communication with the teacher. The vocalization pattern was almost steady and not too different from that of hearing children. When the teacher turned the volume control off, the child continued to watch the teacher and to cooperate with her in the situation, but her vocalizations ceased completely. When the hearing aid was suddenly turned on again, the child began babbling and jargoning instantaneously.

The case of one child is presented to illustrate the value of binaural amplification as judged by observers most familiar with the children's everyday habits - the teacher and the parents. Figure 4 illustrates the audiometric results obtained with Case 12. After several months in the home program, this little boy was enrolled in the acoustic preschool nursery program at the Hearing and Speech Center. After several months there, his teacher became concerned that he was continuing to use only single words spontaneously and had not yet attempted putting two words together into a sentence. On the premise that the binaural amplification might be causing the child confusion because of the asymmetry of the hearing loss, the audiologist recommended removing the right ear hearing aid for one month. In one week, the teacher noticed the child was omitting the final consonant sounds from words that he had previously used correctly. In three weeks his speech had regressed to such an extent at home that his mother begged to have the second instrument returned. After wearing two hearing aids again for a few days, his speech and articulation appeared to regain previous levels, and soon afterward he began using short sentences. At a

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[1] Siegel, S. Nonparametric Statistics for the Behavioral Sciences. N. Y.: McGraw-Hill, 1956.

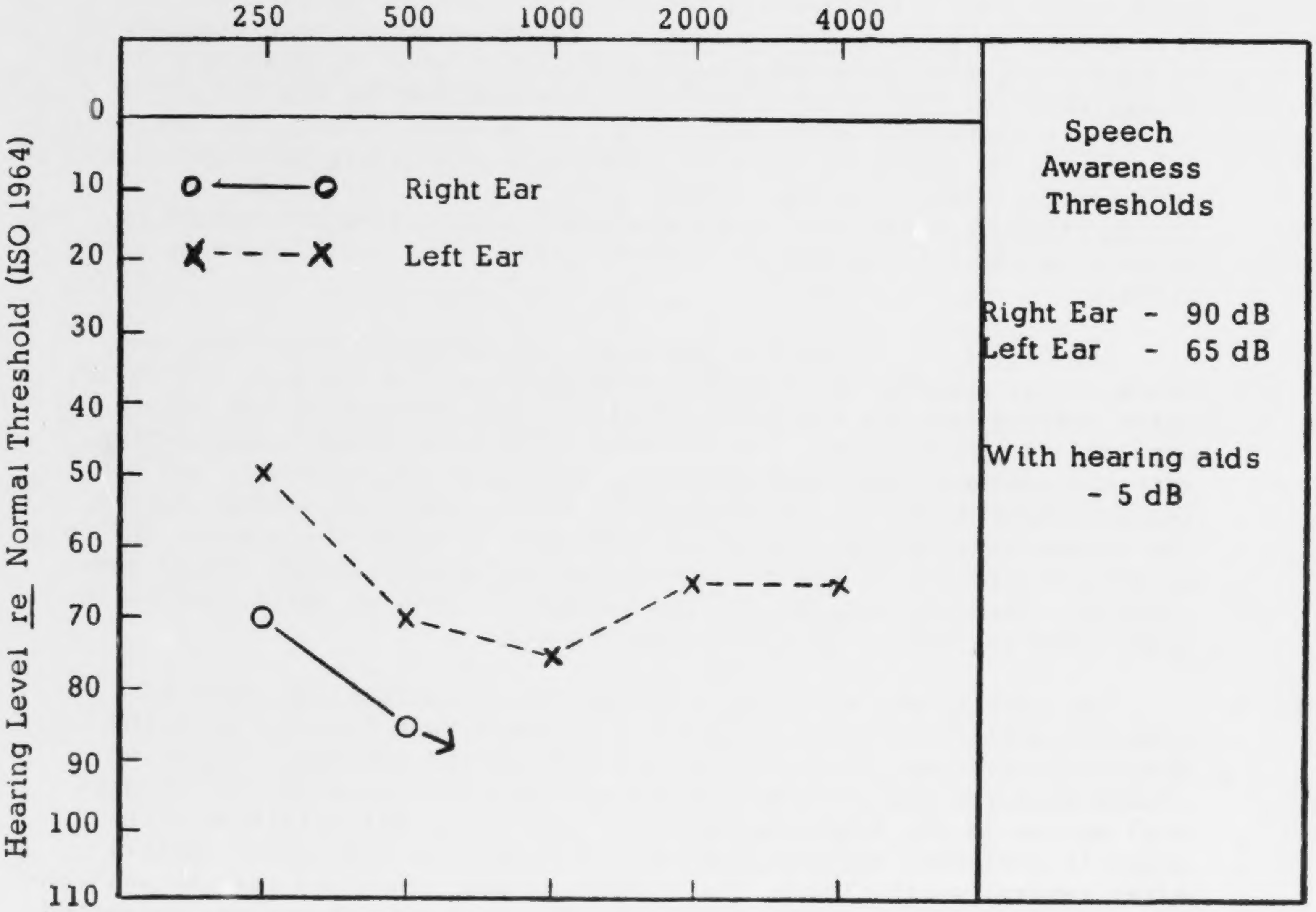

Figure 4. Right and left ear pure tone thresholds by air conduction for subject fitted with binaural hearing aids.

chronological age of 4-0 years, he attained a Peabody Picture Vocabulary Test verbal comprehension level of 2 years, 4 months. Because of his hearing impairment, a gap between his chronological age and his vocabulary level is expected to exist, but it is believed that this gap was greatly lessened by his early training and use of amplification.

Rubella Deafness Group

The initiation of this project in the late spring of 1966 proved to be timely in terms of the high incidence of childhood deafness resulting from the nation-wide 1963-64 rubella epidemic. Approximately one-half of the subjects showed an etiology stemming from rubella in the mother in the prenatal period. The incidence of rubella etiology became strikingly apparent from the rather large proportion of such children who were born in the fall months of 1964 following the peak months of the epidemic in the mid-South in the late winter and early spring months of the same year. One of every five of the total 94 children in the three-year project had birthdates in September, October, November or December of 1964. It was considered of interest to make a special study of these children not only in terms of their hearing loss, but also in relation to physical and mental development characteristics. Although the children in this group did not constitute the total rubella population, they were chosen on the basis of birth dates within the four-month span indicating peak months of the epidemic.

Hearing levels

This rubella population of 19 deaf subjects was characterized by a very severe hearing loss, their mean best binaural average (BBA) for pure tones being at 91 dB ISO with a standard deviation of 13.9 dB. The mean unaided responses computed as the better ear response for each frequency to monaurally presented pure tones are shown in Figure 5. In addition, mean response levels for five percent warbled tones for the 19 children wearing hearing aids are shown.

Table 13 shows the mean bone conduction responses computed from the better ear response at each frequency for 12 subjects for whom such testing was attempted. Three-fourths of this group were able to respond at 250 Hz, five of each six at 500 Hz, and one of three at 1000 Hz. These findings suggested a mixed hearing loss may be present in some of these children, at least in the early years. The mean response levels for complex sounds, including speech, white noise, and recorded environmental sounds, are shown in Table 14, together with the aided response levels for the same sounds. The gains achieved with wearable hearing aids ranged from 34 dB for white noise to 46 dB for speech awareness. Thus, early hearing aid use was apparently providing these children with a great deal of auditory stimulation which was more apparent for complex sound stimuli than for warbled pure tones, as shown in Figure 5.

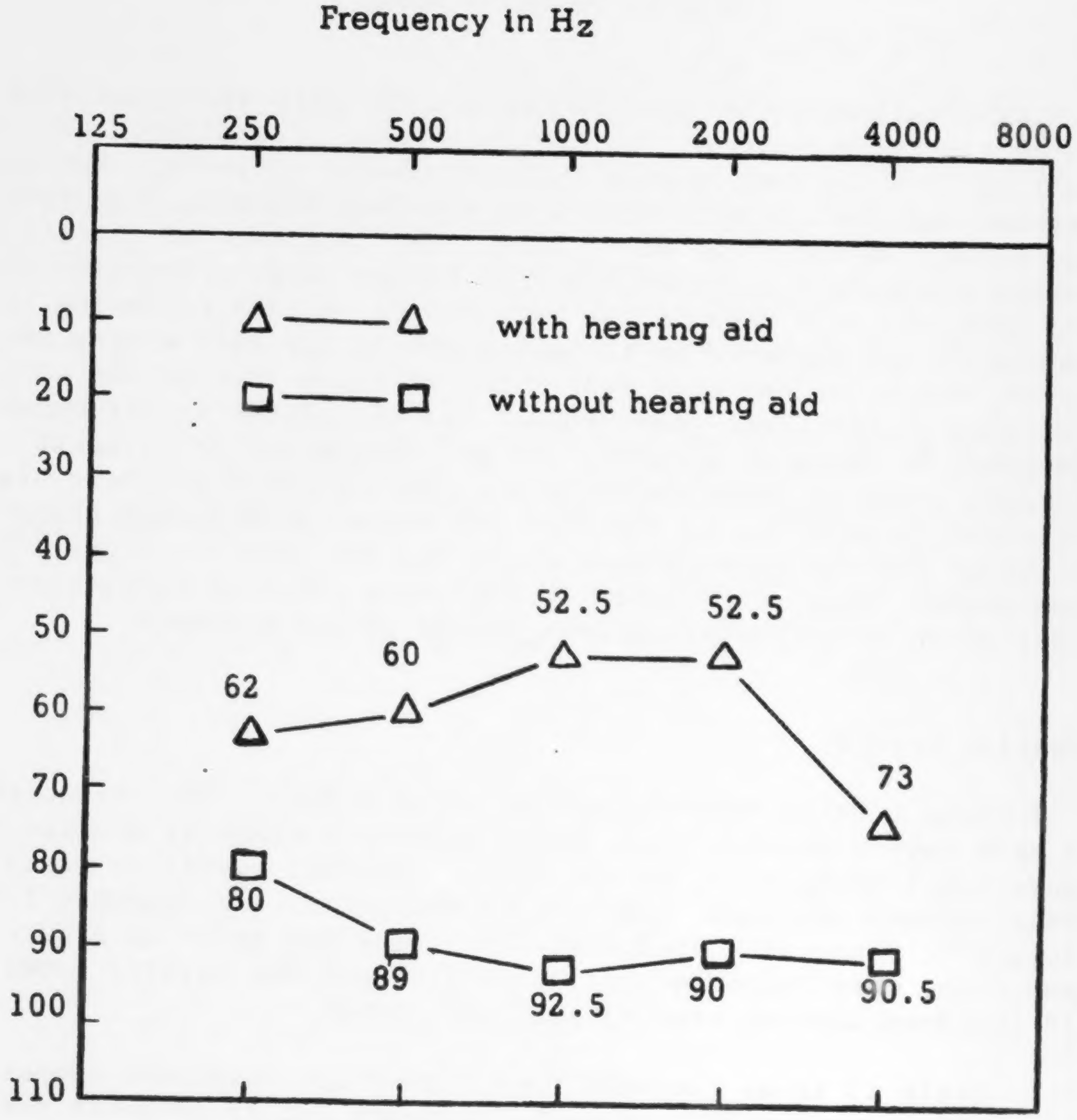

Figure 5. Mean response levels to pure tones for 19 rubella deaf children with and without wearable amplification.

Table 13. Summary of mean bone conduction responses with standard deviations obtained from better ear response at each frequency for 12 children.

	250 Hz	500 Hz	1000 Hz
Number responding	9	10	4
Mean	29 dB	45 dB	62.5 dB
S.D.	4.6	4.9	5.0

Table 14. Summary of mean sound field awareness levels with and without wearable amplification.

	Speech	Recorded Environ. Sound	White Noise
	Without hearing aid		
N	19	19	19
Mean	77 dB	79 dB	84 dB
S.D.	21.9	12.6	13.0
	With hearing aid		
N	19	13	13
Mean	31 dB	38 dB	50 dB
S.D.	15.5	14.1	14.1
Gain with hearing aid	46 dB	41 dB	34 dB

The mean audiometric configuration for air conduction pure tones was relatively flat with no difference (in means) between any two frequencies exceeding 13 dB. Almost one-third of these subjects (N-6) demonstrated an asymmetrical loss with differences of 15 dB or more between ears at two of the three frequencies in the speech range. Five of these six children evidenced little or no hearing in one ear with substantial residual hearing in the opposite ear. Twenty-one percent of the 38 ears tested exhibited a trough-shaped curve in the frequency range 250 Hz through 4000 Hz, and 16% showed a flat audiometric profile with responses across the range differing 10 dB or less. The threshold curves for 18 percent of the ears tested were gently sloping from low to high frequencies with less than 25 dB difference from 250 Hz through 4000 Hz, while 11% showed a sloping loss with a 30 dB or greater difference. In 29% of the ears tested no hearing, or only isolated responses at single frequencies, could be detected. Five percent of the audiograms could not be classified into the above categories.

Another area of interest studied in relation to the resulting hearing losses was the period in which rubella occurred during gestation. This sample included three children with maternal rubella reported at 4-8 weeks gestation, 10 children with maternal rubella reported at 8-12 weeks gestation, and three at 12-16 weeks. The time at which the disease occurred was not known in the remaining cases. Figure 6 illustrates the mean audiometric results obtained for these three groups. The best binaural average (BBA) for the 4-8 weeks group was 103 dB (s.d. - 9.9); for the 8-12 weeks group 97 dB (s.d. - 11.5); and for the 12-16 weeks group, a BBA of 82 dB (s.d. - 5.1). Thus, the 4-8 weeks group appeared to have a more severe hearing loss than shown by the other two groups for which the pattern tended to be a flatter curve. Admittedly, these are very small samples but a trend showing relation between period of gestation and severity of hearing loss in the child is suggested.

Growth and development measures

The results of the height, weight, and head circumference assessments for 12 subjects showed that ten were below the sixteenth percentile in weight, and the remaining two were between the median and the sixteenth percentile. Seventy-five percent were one standard deviation below the mean height for their age level, while the remaining 25% were 0.5 standard deviation below the mean height. All subjects were below the mean in head circumference for the age level, and 50% were below the tenth percentile, according to Vanderbilt Hospital pediatric norms.

Motor development was normal even though physical size deviated. The mean age for first crawling was 7.6 months. Two children (10%) reportedly did not crawl, and their early behavior was described as "scooting." The mean age for walking independently was 12.6 months.

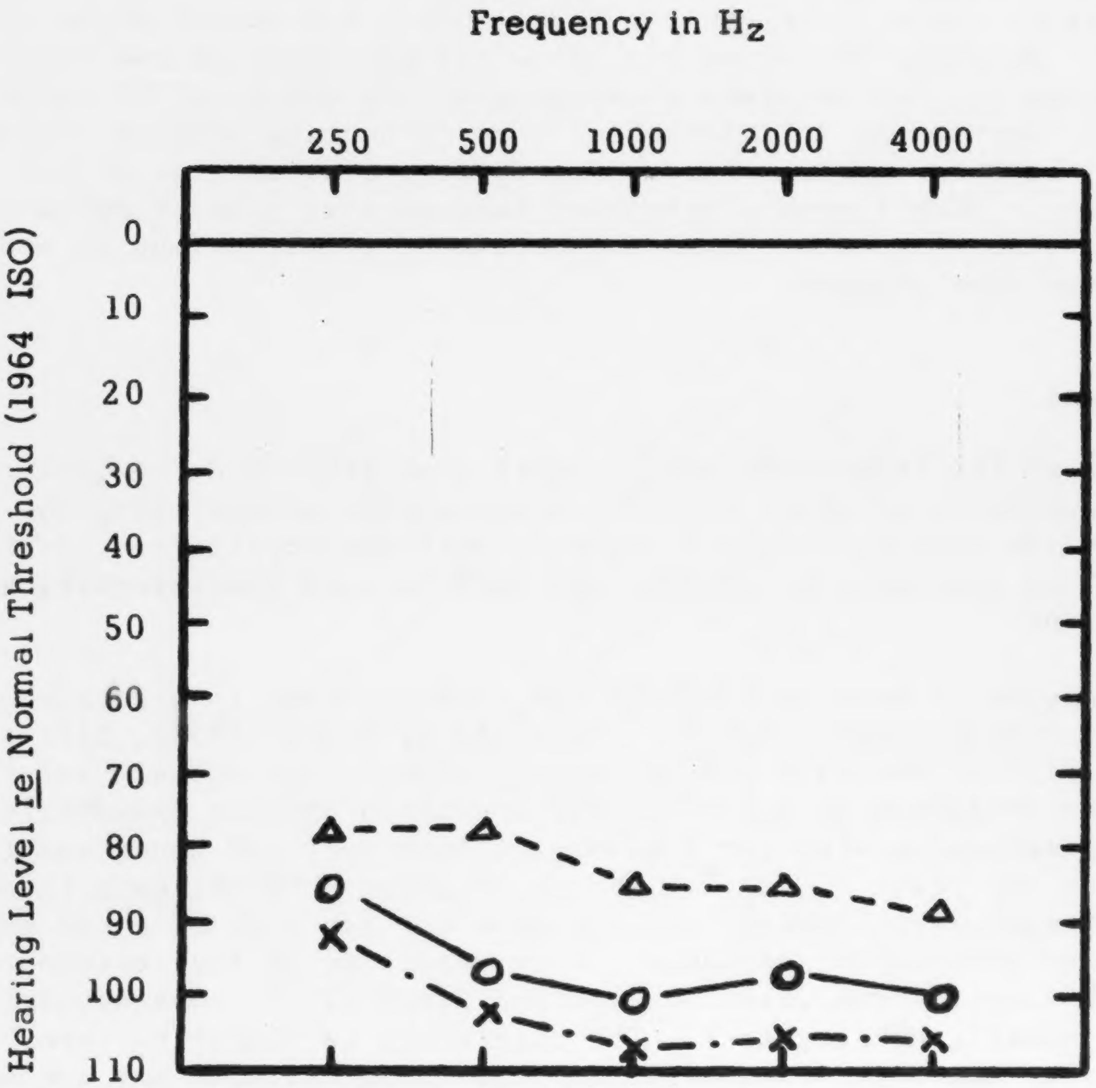

Figure 6. Mean audiometric curves for three groups of deaf children classified by period of onset of maternal rubella.

Intelligence

Data on Learning Ages obtained by administration of the abbreviated form of the Nebraska Test of Learning Aptitude for 14 of the 19 children were studied. Eight scored at age level, while six scored above their age level. No child tested scored below his age level on the basis of the criterion of plus or minus three months. Of the total 19 subjects, three were functioning in a preschool hard-of-hearing nursery program with other hard-of-hearing children of different etiologies at the time of the study. Nine formed a preschool deaf nursery group consisting only of rubella children. Seven subjects were participating in a parent-oriented home program.

Implications

Although the relatively small sample population and the lack of a control population prevents definitive statements generalizing the results from the present sample to rubella deafness populations, certain trends in the audiometric, growth, and intellectual characteristics were apparent.

The degree of hearing loss and the configuration in general confirmed the predominantly flat loss reported by Fisch (1958), Barr and Lundstrom (1961), Sheridan (1964), Vernon (1967), and Jackson and Fisch (1958). An incidence of approximately one-third showing asymmetric loss is in agreement with the findings of both Barr and Lundstrom (1961) and Jackson and Fisch (1958). Although 29 percent of the ears tested had only fragmentary hearing, the opposite ear for most of these subjects showed substantial residuum. Only about one in five evidenced the trough-shaped curve which Jackson and Fisch (1958) considered to be common in rubella hearing loss. The difficulty in eliciting threshold responses for the high frequencies in very young children may account for this factor, however. Nonetheless, the lack of any one predominant type of audiometric curve in this sample suggests that perhaps the 1963-64 rubella hearing impaired child cannot be easily categorized in this respect.

The degree of impairment found (mean BBA - 91 dB) supported the findings of Hardy *et al*. (1966), Monif *et al*. (1966), and Bordley *et al*. (1967) that 1963-64 rubella children are afflicted with rather profound hearing losses. Although the bone conduction responses noted in some subjects may have been vibratory in nature, the presence of such an air-bone gap in the low frequencies may also give tentative confirmation to Richards' (1960) findings that mixed losses are not uncommon in rubella deafness.

Most significant from the standpoint of remediation programs is the difference in hearing levels for pure tones, live voice, noise, and recorded environmental sounds with and without the wearable hearing aid. The mean gain of 46 dB for speech awareness evidences that these subjects had learned to make good use of their residual hearing, the first goal of an acoustic program. The advantage of early wearable amplification, which was binaural for 16 of the 19 children, is seen in this effective utilization of auditory potential.

Of interest also was the comparison of the audiometric characteristics of these subjects in relation to the time of occurrence of rubella in the mother, which revealed that in the present sample the later onset was associated with less severe hearing loss in the child. This finding supported the results of Barr and Lundstrom (1961) indicating the greatest severity of hearing loss from rubella in pregnancy coincides with the disease occurring in the second month; however, it should also be noted that the findings of these same authors and of Hardy et al. (1966) that damage to the auditory system may continue into the fourth month are also supported by the present results. Ormerod (1960) attributes the severe impairment during the second and third months to the effects of the rubella virus on the cochlear duct during its beginning and major developmental stages, 6-8 weeks and 8-12 weeks, respectively. The deafness in the fourth month rubella subjects has been explained by Ward et al. (1968) on the basis of damage to the cochlea from viral endolymphatic labyrinthitis produced by the rubella virus.

The results obtained on growth and development in the present sample agreed with the findings of Barr and Lundstrom (1961) and Desmond et al. (1967) that rubella children show height, weight, and head circumference measures below their age level. The head circumference measures were below the norm for all subjects, with one-half significantly below their age level. Motoric development, however, as indicated by the mean ages for crawling (7.6 months) and walking independently (12.6 months) for this sample of rubella children was quite normal, and in fact slightly advanced in crawling behavior, according to Gesell's norms.

Results of the assessments of intellectual functioning, which for these subjects was at or above age level, are in opposition to the opinion of Miller (1967) and the experimental findings of Vernon (1967) and Myklebust (1958). Explanation for this lack of agreement may be found in the fact that children with multiple handicaps indicating severe involvement were eliminated. Furthermore, the parents of these rubella children had been participating in the home teaching program and some of the children subsequently enrolled in a daily nursery program designed to develop maximally the use of audition and language. Additional testing of these same subjects six months later with a visual-motor integration assessment and another psychological screening measure substantiated that all subjects were functioning at or above age level with the exception of one child, who gave evidence of mild retardation. Suffice it to say that these particular children evidenced mental ability which negates any broad generalization that rubella populations can be characterized by retardation and central learning disorders. There is a continued need, however, for more information on the characteristics of the 1963-64 rubella children. As they reach school-age, educators will need extensive knowledge of their hearing potential and learning characteristics in order to deal most effectively with them in the education process.

Other Performance Measurements

Evaluation Instruments

It has been previously shown that the instruction of parents is a significant factor in improved use of residual hearing in very young deaf children, but other types of measurements are necessary to evaluate the gains in such areas as the development of speech and language, mental development, social maturation, and the general level of competence in communication as denoted by the child's ability to compete successfully in a given educational placement. As pointed out in the original application, it is not easily possible to find such measures for children with little or no language. Several different measures were employed in the course of the project, but the one which was seen most pertinent to the measurement of language growth at this age was the Communicative Evaluation Chart (Anderson, Miles, and Matheny 1963). It draws upon language and performance items from several standard measures of infant development and intelligence. This scale, which is routinely used in diagnostic evaluations performed in the Language Clinic of the Hearing and Speech Center, provides a measure of both the child's Language Age and his Performance Age. Since the child with depressed Language Age and normal or near normal Performance Age may be considered generally normal in his abilities other than in his use of language, it is particularly helpful in the evaluation of deaf children, who as a population are known to have normal mental ability, but with depressed functioning because of inadequate language.

A second measure used was the Vineland Social Maturity Scale which provides an estimate of the child's development of independent functioning. At earlier age levels it reflects, partially at least, indices of mental growth, although the language handicap in deafness may be expected to depress the Social Quotient somewhat.

Finally, demonstration of the results of such a program is seen in the child's ability to communicate orally and aurally in his environment, as recorded on tapes and observed by teachers and parents, as well as by the educational placement in which he is functioning. While the speech of a number of subjects has been recorded illustrating the development of their language levels, it is not possible to include these tapes with the final report. They have been used, however, in reporting results of this project at a national meeting in November 1969 when the American Speech and Hearing Association convened in Chicago. Selected language responses from taped interviews with the teacher and the parent are included in Appendix B; these samples demonstrate the ability of these children to handle syntax and morphology with much greater ease than is usual for hearing impaired children at preschool age levels.

Group means indicating the initial levels of functioning on the Vineland Social Maturity scale and on the Communicative Evaluation chart are shown in Table 15.

Table 15. Mean Vineland Social Quotient and CEC Language Age and Performance Age at first evaluation.

	N	Mn CA	Mn Vineland SQ and CEC Levels	Stand. Dev.
Vineland Social Maturity	89	2 yr. 2 mo. (S.D. 10 mo.)	83.8 (SQ.)	22
CEC Language Age	86	2 yr. 2 mo. (S.D. 10 mo.)	7.9 mo.	2.6 mo.
CEC Performance Age	86	2 yr. 2 mo. (S.D. 10 mo.)	20.8 mo.	8.1 mo.

Analysis of data

Relation of Language Age gain to other variables. Although the total number of children seen in the three-year period was 94, many of this group were seen for relatively short periods of time after which they were referred to programs nearer their home. Several children proved to be atypical or multiple handicapped and were transferred to other programs more suited to their overall needs. Some dropped out of the program because of lack of parental cooperation, hardship imposed by long trips to and from the Center, or for other such reasons. The population also was continually shifting, since those who remained in the program were transferred into the daily preschool at the Hearing and Speech Center as they became three years of age, and new ones were entering the program throughout the project period. It seemed reasonable, therefore, to select a subgroup from the population which would best represent the home teaching program on the basis of having been in the program a sufficient length of time to justify conclusions on the value of the program. Thus, the group of children from whom the data in the following pages were collected were chosen on the basis of having been in the home program initially and thence transferred to the Center's acoustic nursery at two and one-half to three years. Twenty-eight children completed one academic year in this nursery (1968-69) after having first been seen with their parents in the infant program. Table 16 provides mean data on these 28 children, describing them in terms of a number of parameters to be further reviewed in this section.

Table 16. Summary description of 28 children with respect to parental occupational classification, amount home program instruction, and hearing level for speech.

	Mean	Stand. Dev.	Range
Parents' occupational classification	3.9	1.8	1-7
No. home visits	21.2	12.8	7-57
No. hr. instruction	27.2	16.1	7-68.5 hr.
	HEARING LEVEL		
Speech awareness level, 1st Exam, unaided	71.6 dB	15.2 dB	40-100 dB
Speech awareness level, 1st exam, aided	48.6 dB	21.3 dB	20-100 dB
Speech awareness level, last exam, aided	27.1 dB	17.2 dB	8-65 dB

A comparison of the mean Chronological Age with Language and Performance Age is shown in Table 17, which reveals that the mean length of instruction period for the group was 27.8 months. In terms of the Language Quotient the group advanced from 33.6 to 52.1, while the Performance Quotient remained stable. Figure 7 illustrates the marked acceleration in Language Age gain from the pre-instruction period to the post-instruction period contrasted to the Performance Age gain curve which remained virtually linear, being depressed from the expected level of functioning by a rather small margin not out of keeping with handicapped children's performance generally. The Language Age, however, which was greatly depressed in relation to the Performance Age in the beginning, is accelerated in approaching the expected norm by advancing 21 months in the 28 months time lapse. Such progress was at about 75% expectation compared to the pre-instruction period, at which time the Language Age was at about 30% expectation (LA = 8 mo.: CA = 27 mo.).

The 28 children were studied further by dividing them into three subgroups on the basis of Language Age gain in months -- in other words,

Table 17. Pre- and post-instruction comparisons for 28 children on Chronological, Language and Performance Age.

	Mean	Stand. Dev.	Range	Diff.
	Chronological Age			
Pre-instruct.	27.5 mo.	8.2	10 - 40 mo.	27.8 mo.
Post-instruct.	55.3 mo.	8.6	34 - 69 mo.	
	Language Age			
Pre-instruct.	8.4 mo.	2.3	4.7 - 13.8 mo.	20.8 mo.
Post-instruct.	29.2 mo.	13.0	12.7 - 57.0 mo.	
	Performance Age			
Pre-instruct.	23.2	---	9.2 - 30.8 mo.	24.7 mo.
Post-instruct.	47.9 mo	---	26.6 - 60.0 mo.	

the one-third with the greatest amount of gain, the middle third, and the one-third which made the least gain. The mean Language Age and Performance Age for these three subgroups are shown in Figure 8, in which it may be seen that the Language Age for the subgroup making the most progress actually exceeded expected gain, by acceleration of 35 months in the 27 month period. The correlation between Language Age gain and number of visits was .45, significant at less than the .01 level. Thus, it would appear that the more instruction the child had in this program, the more Language Age gain ensued. Performance Age, however, was not significantly correlated (r = -.19), suggesting that in nonverbal areas these children were progressing normally irrespective of the special program.

As might be expected, the level of hearing for speech proved to be one of the better indicators of the child's potential use of residual hearing in the early years. Thus, this population is described in terms of hearing level for speech at the time of intake, both with and without a wearable hearing aid. The first responses recorded with a hearing aid, as noted previously, might have occurred a week or two after the first audiologic visit. In contrast to their performance with the hearing aid

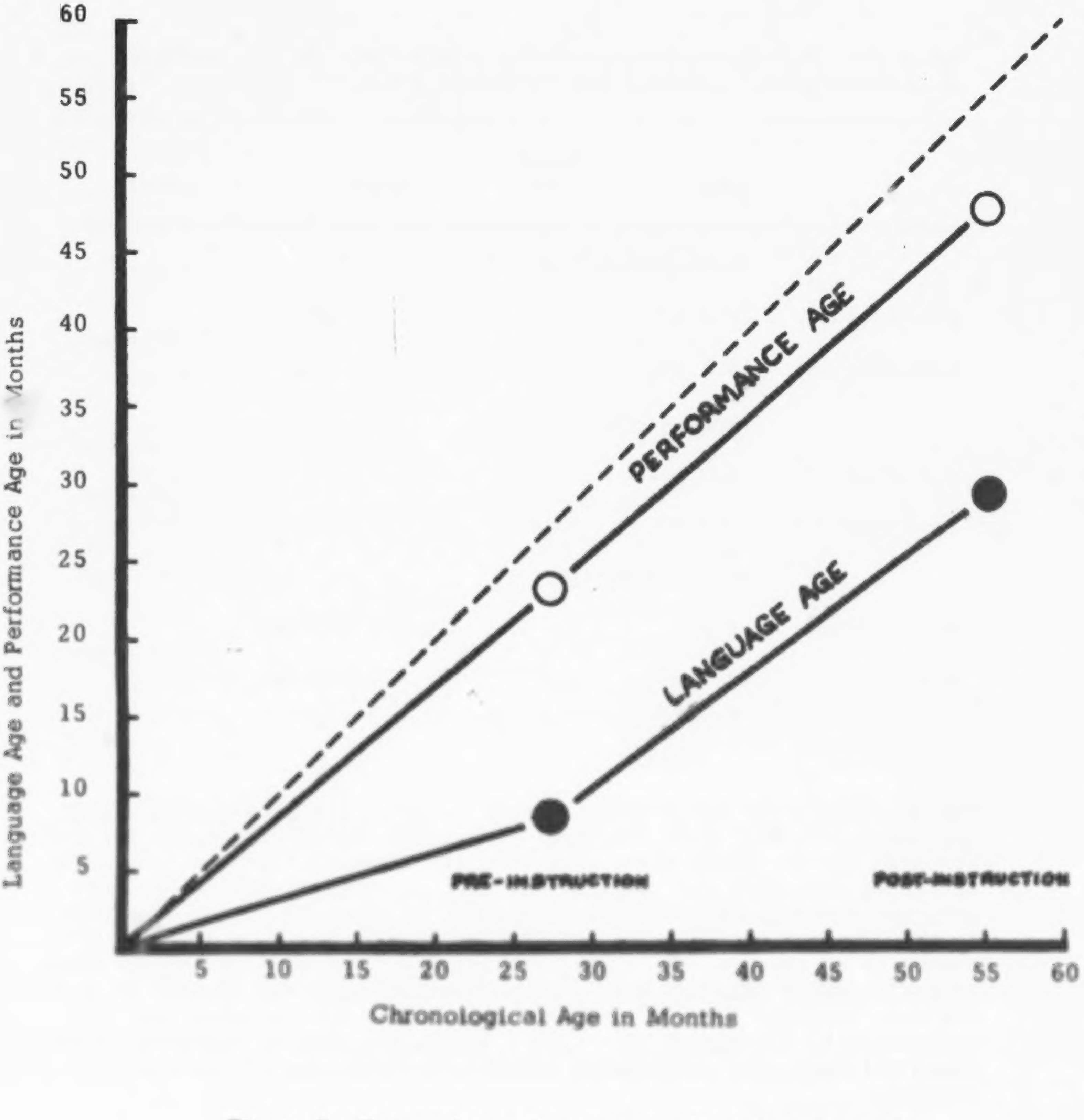

Figure 7. Comparison of mean growth curves depicting Performance Age and Language Age increase as measured by the Communicative Evaluation Chart for 28 deaf children. (Dotted line represents expected rate of increase for the normal child.)

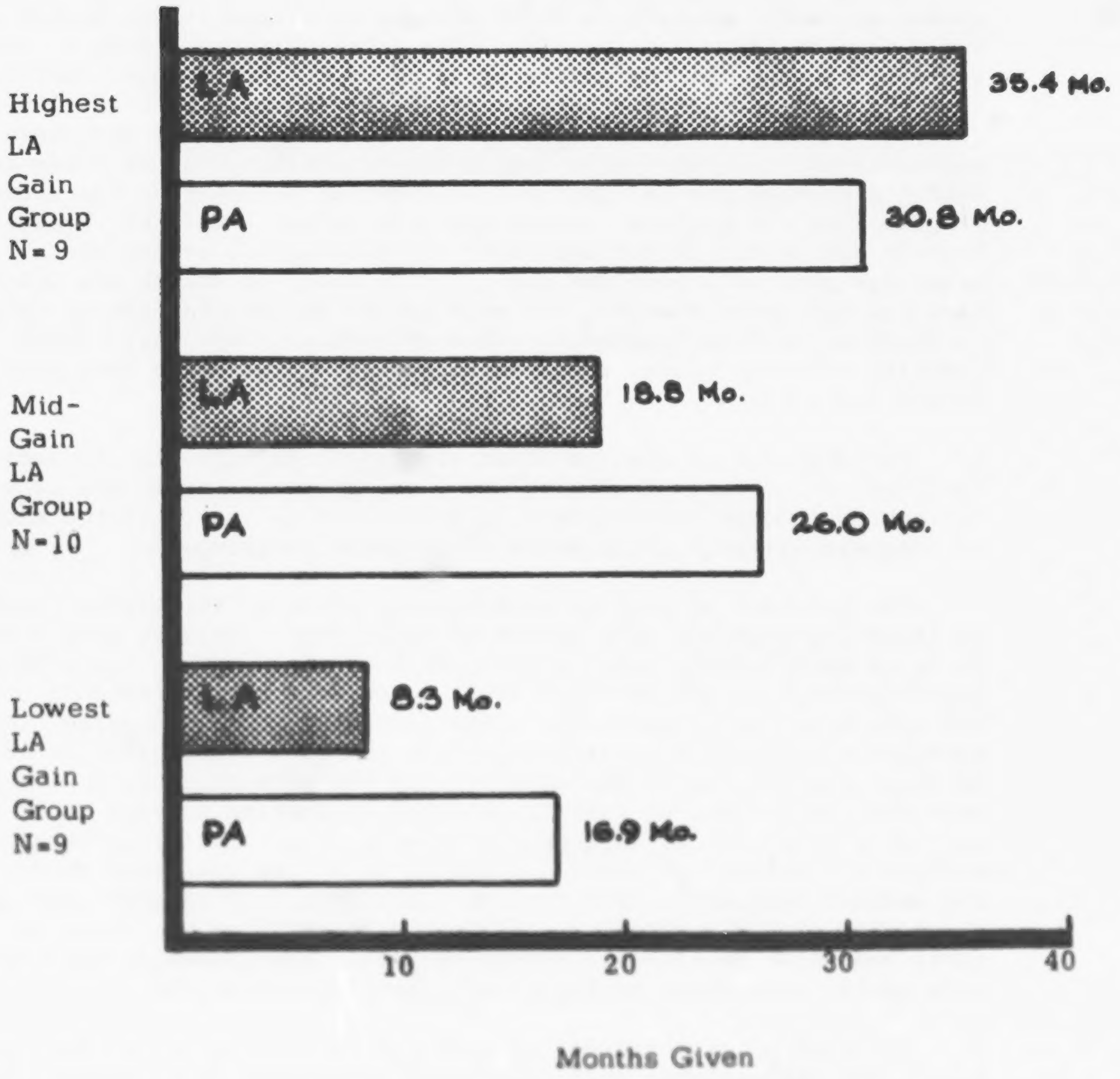

Figure 8. Comparison of Performance Age and Language Age mean increases during instruction for 28 children subdivided on the basis of Language Age gain.

at the time of the first test, response at the time of the last test (following the instruction period) demonstrated that each of the subgroups improved markedly in their ability to attend to the spoken voice while wearing their hearing aids. The dotted line in Figure 9, representing the mean for the entire group of 28 children, shows they could hear the spoken voice at the time of the first visit at a level of about 72 dB. The first hearing aid test elevated their speech awareness response to about 48 dB. Upon completion of training the response level with the hearing aid had improved to about 28 dB, nearing the normal range. Thus, it appears evident that the better levels of residual hearing and better performance with the hearing aid are related to Language Age gain in a positive manner. The subgroup making the least Language Age gain, however, did make rather marked response in relation to their ability to respond to aided speech, although their level of function remained poorer than that of the group with the best hearing levels initially.

Language Age gain was further studied in relation to the Social Quotient, illustrated in Figure 10. Again, the better levels of social maturation functioning appeared to be a positive factor in the amount of Language Age gain achieved by these three subgroups.

The relation of gain in Language Age to other factors is summarized in Table 18, together with levels of significance for the obtained r's. It is of considerable interest to note that the Language Age gain was significantly correlated to all factors other than the level of hearing for speech at the first visit. This finding further emphasizes the importance of continuing audiologic study for each deaf child tested in infancy, and the importance of providing him with acoustic input, even when the first level of hearing obtained by testing appears to be so poor that he cannot be expected to benefit. The ability to respond with amplification initially appears to be a more important factor than the unaided response. This finding would certainly suggest that we should not withhold acoustic training for a child on the basis of the first audiogram, but should provide wearable amplification and training very early, regardless of the child's ability to respond.

Relation of occupational classification of parents to other variables. The occupational classifications of parents after Warner, Meeker, and Eells[1] ranged from the lowest to the highest (one to seven). It may be seen in Figure 11 that children in the upper half on the basis of occupational status of parents did make more gain in Language Age than the lower half. The upper half also exceeded the lower half in the number of visits and in Vineland Social Quotient. Both Vineland Social Quotient and the Language Age gain were significantly related to occupational status of the family (Table 19). This finding suggests that there are many obstacles to parents of deaf children at the lower socio-economic

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[1] Warner, W. L., Meeker, M., & Eells, K. Social clas in America. New York: Harper & Row, 1960.

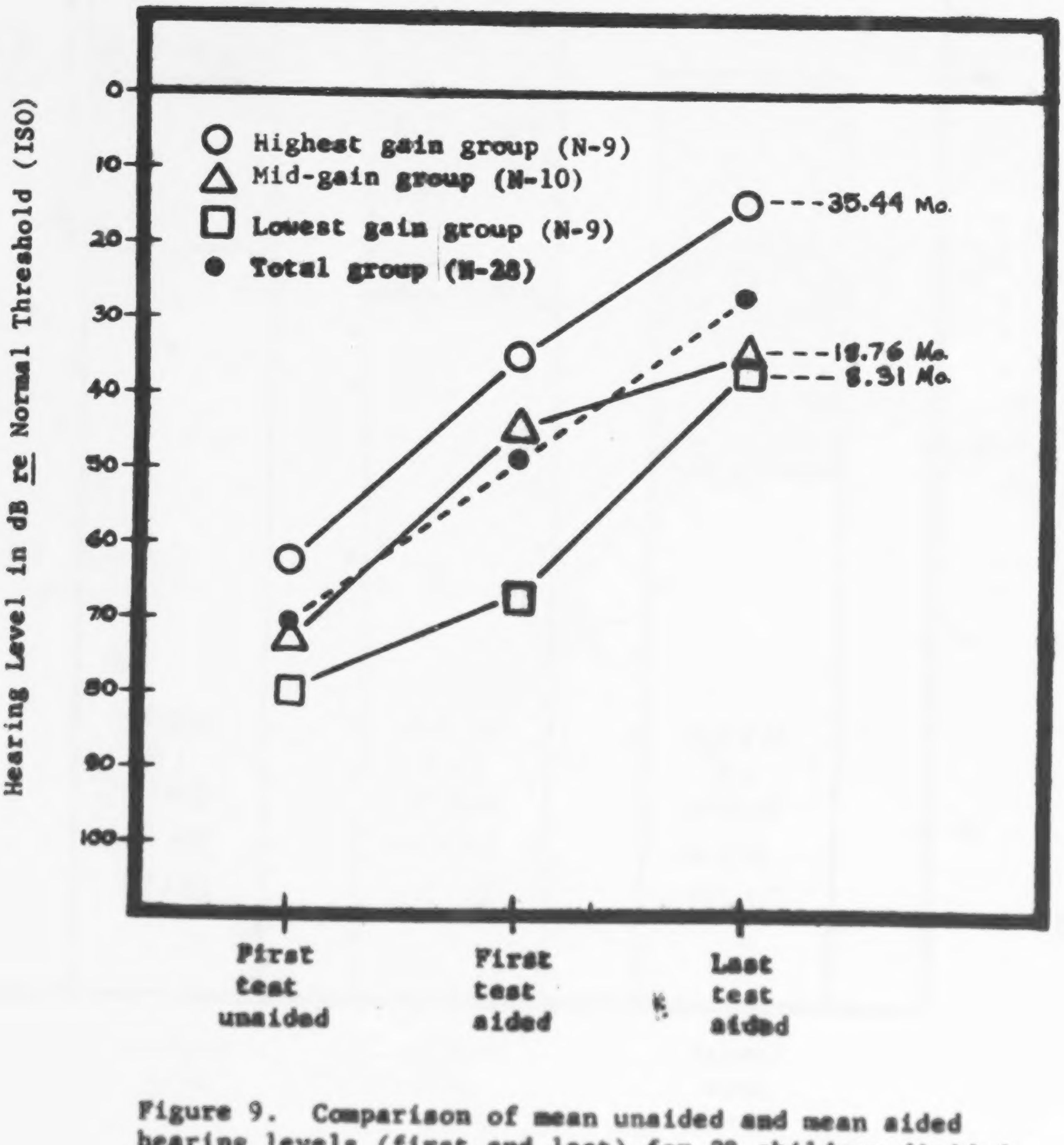

Figure 9. Comparison of mean unaided and mean aided hearing levels (first and last) for 28 children divided into three subgroups on the basis of Language Age gain. (Figures at right indicate mean L. A. gains for the three subgroups.)

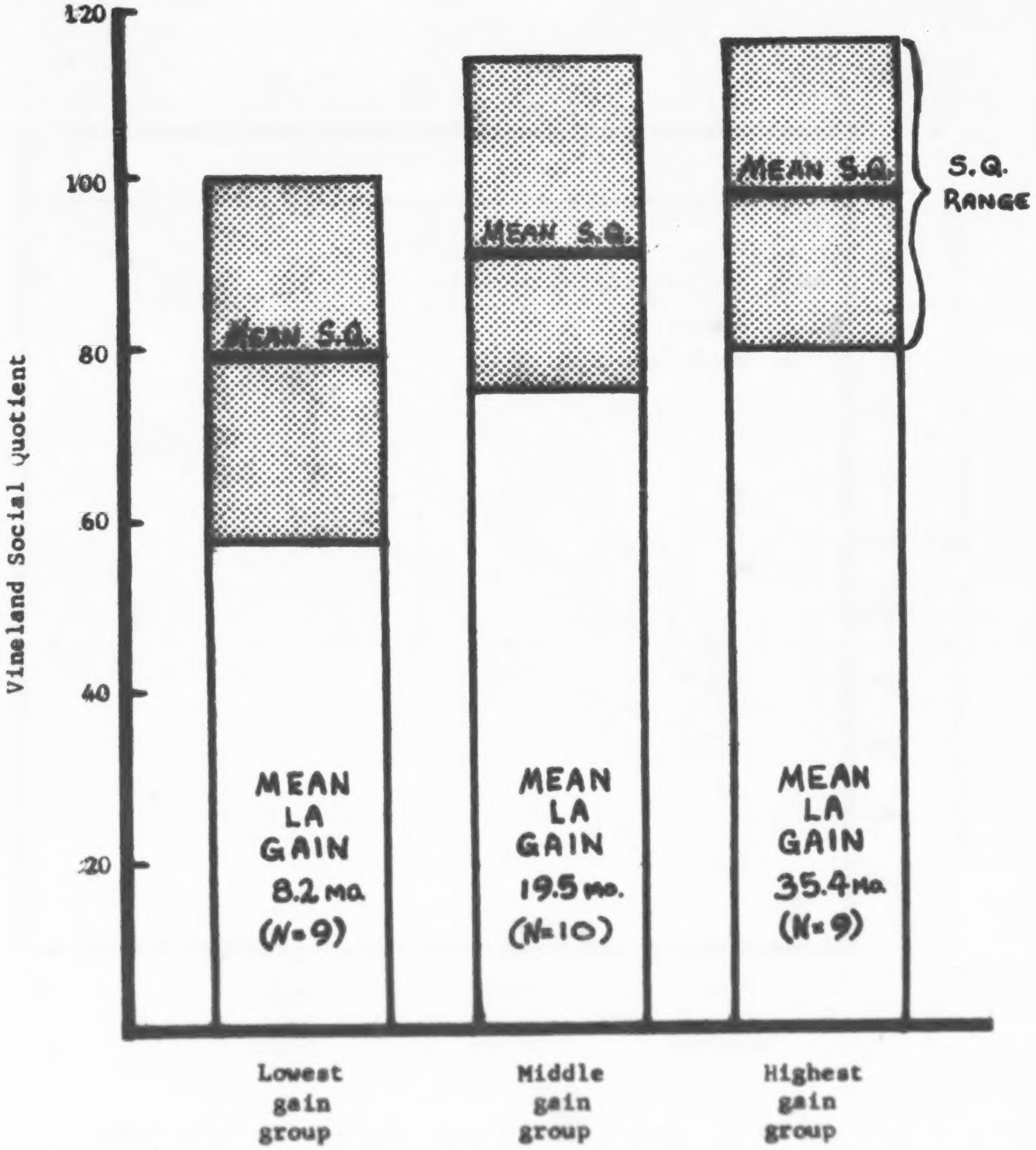

Figure 10. Comparison of Vineland Social Maturity Scale levels for three groups of children divided on the basis of Language Age gain.

Table 18. Correlations obtained for Language Age Gain compared with other variables.

	Spearman rho	p
Language Age Gain vs:		
Speech Awareness Threshold, Unaided, First Exam	.25	>.05
Speech Awareness Threshold, Aided, First Exam	.71	<.01
Speech Awareness Threshold, Aided, Last Exam	.57	<.01
Occupational status of parents	.41	<.05
Frequency of visits	.45	<.01
Vineland Social Quotient	.49	<.01

levels, as far as taking advantage of resources for assistance within the community is concerned.

Comparison of home program subjects with non-home program subjects in Mental Age growth. Although this project was not designed to have a control group of subjects, it was possible to study subjects in the nursery and kindergarten in comparison to another group of children who had entered the program at age three or older, and who had not had the benefit of the home teaching program. This group, admittedly small, was compared with the home program group after one year of daily half-day periods of instruction in acoustic preschool during 198-69. A portion of the children from the home teaching program were gtuped with an equal number of normal hearing children in their nursey-kindergarten experience. Results obtained from pre- and post-instrction testing for the school year, using the Visual-Motor Integration Test, the Leiter

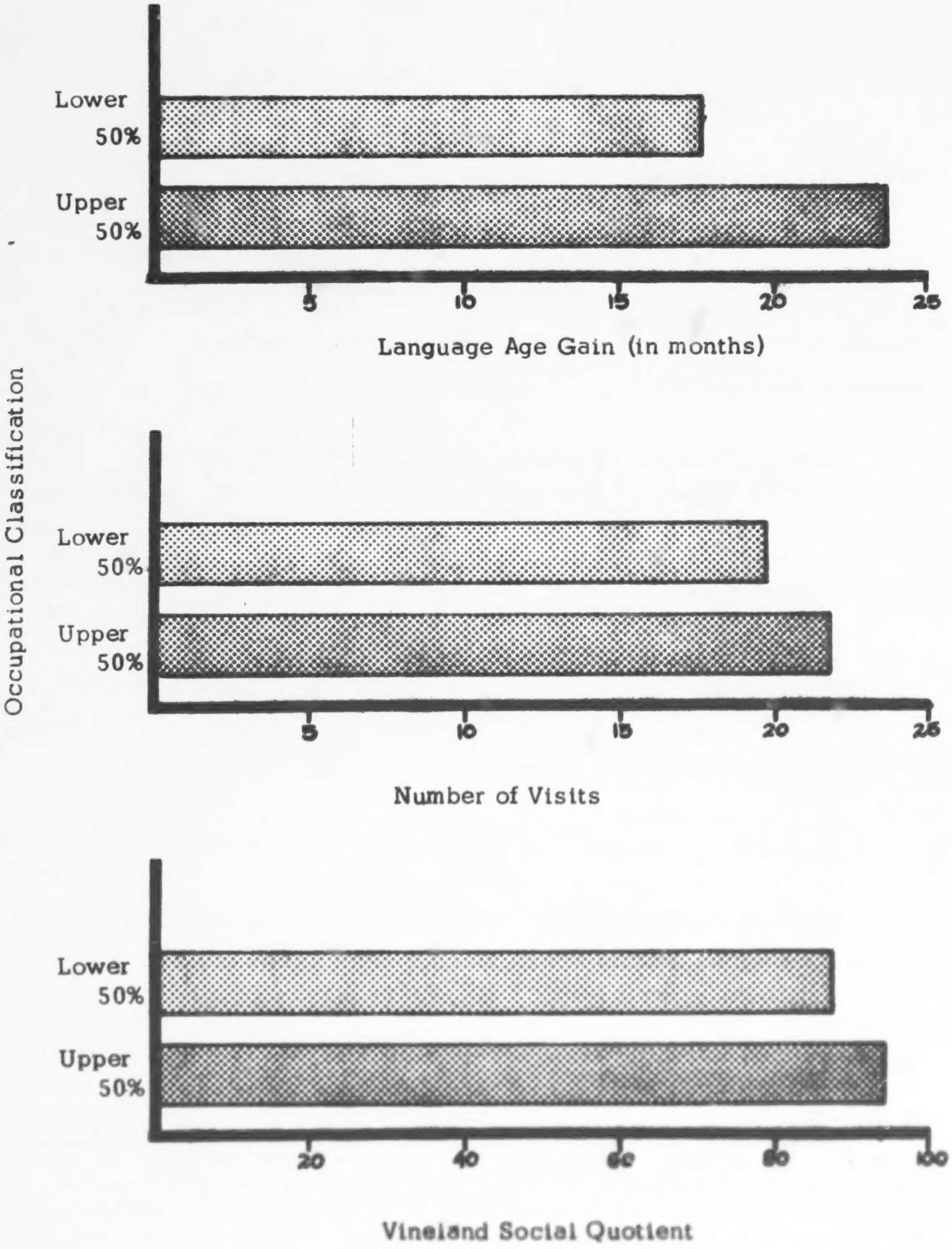

Figure 11. Comparison of lower half (parents' occupational status) with upper half on Language Age gain, number of visits, and Vineland Social Quotient.

Table 19. Correlations obtained for Occupational Status of Parents compared with other variables

	Spearman rho	P
Occupational Status of parents vs:		
Language Age Gain	.41	$<.05$
Frequency of visits	.30	$>.05$
Vineland Social Quotient	.54	$<.01$

International Performance Scale, and the Peabody Picture Vocabulary Test are summarized in Figure 12. It is interesting to note that in eight months time the experimental group gained in Leiter Mental Age exactly eight months, as one would anticipate if first evaluations were correct. The group without previous instruction gained 11 months, however, which has very important implications. It suggests that the training program facilitated their ability to respond to testing situations, and that their first level of intellectual functioning, as assessed, was not in accord with their potential. The home program subjects having had more instruction and training were already at their age level at the beginning of the preschool period on the Leiter, whereas the control children were not.

Little or no difference was noted in the gain in visual-motor integration, although both groups had an acceleration over the amount that would normally be anticipated. Most interesting are the findings on the Peabody Picture Vocabulary Test, which assesses one aspect of language--vocabulary development. The home teaching program group again were exactly on schedule with eight months gain in eight months time. The children without such previous training, however, gained only four months in eight months time, suggesting the home teaching program better prepares the children to take advantage of language instruction at the preschool period.

Present level of functioning and educational placement. As a means of assessing the value of such a program, the actual level of functioning in the educational environment represents most adequately the benefit of the program, albeit rather hard to quantify such data. The present placement, however, is distributed as follows: 36 children are

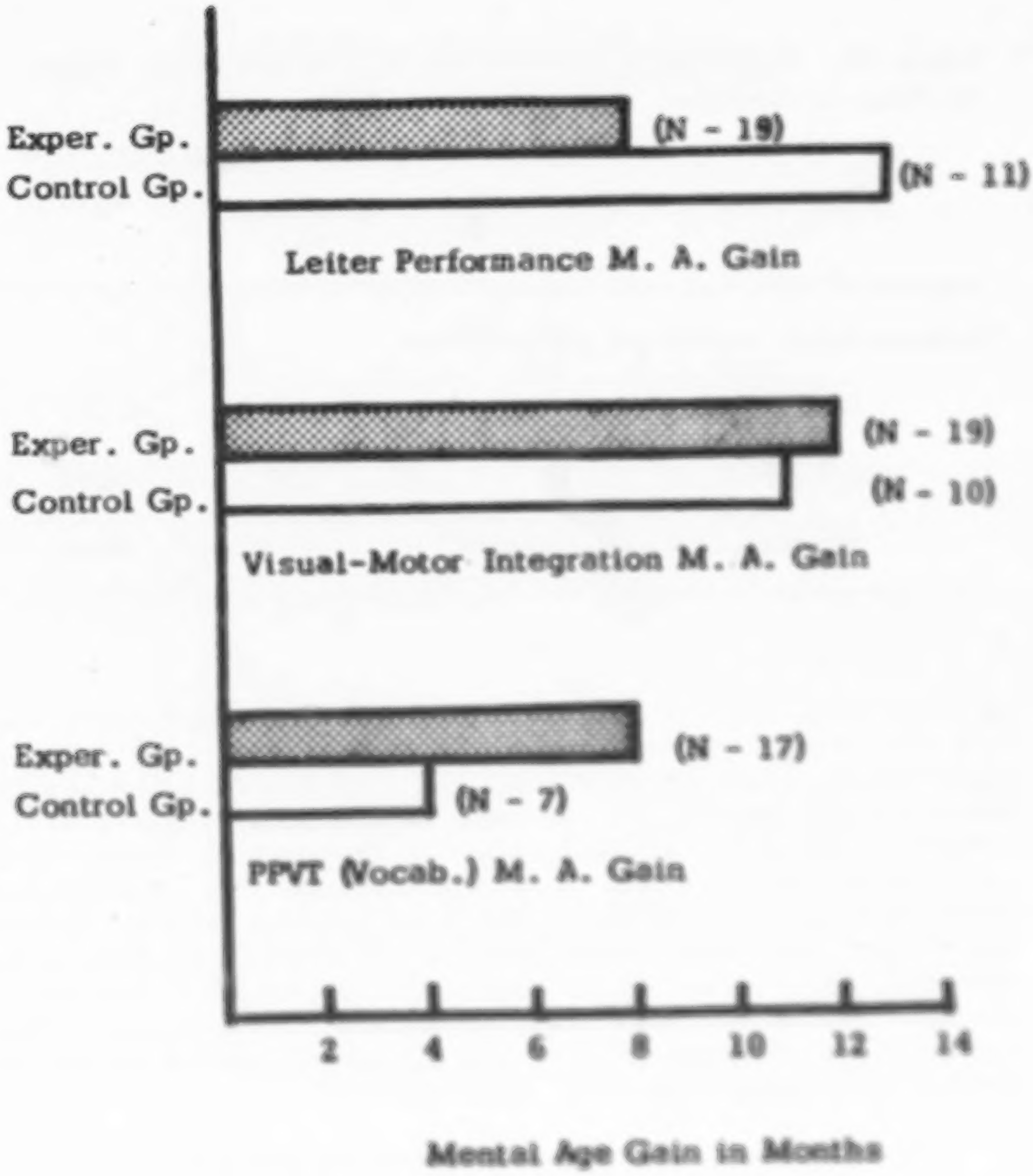

Figure 12. Comparison of mean gains in Mental Age Months during 8 - months preschool instruction for experimental group from home teaching program and control group entering a preschool program without such instruction.

in a daily acoustic preschool program; 22 have either left the vicinity and placement is unknown, or they dropped from the program because of poor attendance or lack of transportation and other such factors; nine with atypical deafness are now placed in other programs for multi-handicapped children; eight are enrolled in a state residential school for the deaf; four are competing successfully in a normal kindergarten, returning to the Center for one hour of supportive therapy daily; and two children are attending normal kindergarten for one-half day and the daily acoustic preschool for one-half day. One child is in public school acoustic day classes, and one child is being seen for therapy only. Three children at this writing were still in the home program where services to their families were being continued.

Examples of language functioning are a further indication of the results to be anticipated from early intervention. Excerpts from taped recordings of interviews involving children and their mothers are presented in Appendix B. Care was taken to transcribe verbatim these conversations, which reflect an excellent use of morphology and syntax as well as vocabulary.

Results with Parents

In an attempt to assess the effectiveness of the program for parents an analysis was made of parental personality, information, and attitude measures in relation to teachers' rankings of parental effectiveness. Since this project was parent-oriented, emphasis was placed on the parent's role in the child's early language training. The object was to capitalize on the parents' natural way of stimulating and responding to their child. The role of the teachers was to guide the parents in helping their child develop his maximum potential in these first years of life. The variables in assessing effects with parents are innumerable, and the search for appropriate measures did not really yield what might be considered the most successful results. The parents themselves came from a widely varying range of socio-economic levels and educational backgrounds, as has been shown in previous sections of this report.

The John Tracy Clinic Parent Attitude Scale and the John Tracy Clinic Parent Information Scale were used to assess changes in attitudes and information. The Information Scale is composed of 16 multiple-choice questions concerning information related to the audiologic management and care and the educational handling of the hearing impaired child. The Attitude Scale is a five point rating scale of attitudes concerning child rearing practices and family relationships in terms of the deaf child.

Another instrument used was the Tennessee Self-Concept Scale (Fitts 1965), which was designed to assess objectively a person's concept of himself. This scale is composed of 100 self-description items and a variety of scores, including a self-criticism score indicating the individual's capacity for healthy self-criticism, a total P Score reflecting overall level of self-esteem, and a family self-score assessing one's feeling of adequacy, worth, and value as a family member.

The teachers in the project were asked to rate the parents on the basis of a five point rating scale (5 - Superior, 4 - Good, 3 - Average, 2 - Fair, and 1 - Poor) and also to rank-order the parents in terms of their total effectiveness in dealing with their child. These ratings and ranks were compiled following termination of the parents in the program, and initial and final measures on the other scales were obtained at the same time.

John Tracy Clinic Information Scale

To determine the correct responses on this scale, the measure was first administered to six professionals in the area, all of whom had children themselves and were closely associated with the project. All of these individuals agreed on the correct choice for 14 of the 16 items; on the two remaining items five of the six professionals were in agreement, and thus these choices were scored as correct. For a comparison of the entrance and termination scores of 40 parents, the improvement in number of correct responses was computed. Figure 13 shows the number of parents obtaining various degrees of improvement. Seventeen of the 40 parents showed negative or no improvement, 18 showed between 1-50% improvement, and five 50-100% improvement. The sign test for the significance of the difference in before and after scores indicated that the program affected a significant change in parent information ($z= 2.07$, $p \leq .0192$).

John Tracy Clinic Attitude Scale

For purposes of scoring the Attitude Scale the five points on the scale were assigned values of one to five, and changes in attitude from initial to final tests were computed on the basis of difference scores for each item. The six professionals mentioned above were also administered this scale twice within a two month interval. The mean change in the parents' scores was 17.5, and the mean change for the professionals was 13.8. Attempts were made to judge the consistency of answers to the items on the scale among the professionals on the first administration. For no item was the consistency considered adequate, since for many of the items three of five possible answers were selected by at least one of the professionals, and on no item did more than four of the six agree as to the correct answer. Changes in parent attitudes during their participation in the program were compared to changes in the professionals' attitudes during the two month interval using the Mann-Whitney U. The z of .08 ($p= .4681$) was not large enough to reject the null hypothesis that the two samples were from different populations. It had been assumed that the professionals would answer this scale using their best judgement as to the proper handling of the deaf child and that there should be little change over time in their opinions and further that their attitudes should differ significantly from the parents' who were untrained in the area at initial testing. Comments of the professionals about the usefulness and effectiveness of the scale included the following: "This scale seems very ambiguous . . . we are not stressing these areas in our program." For these reasons, the results of this scale were not included in further analyses.

Tennessee Self Concept Scale

Scores obtained from the computer analysis of the before and after administrations of this scale were studied to determine if the program had any effect on the parents' self concept. The sign test revealed that the 26 pairs of self-criticism scores available were significantly different ($p= .004$). The 23 pairs of scores available for the Total P Score were not significantly different ($p= .105$). The 23 pairs of Family Scores available were not significantly different ($p= .50$). Further analysis included only the self-criticism scores as these were the only scores which appeared to be affected by the Home program in terms of personality variables of the parents.

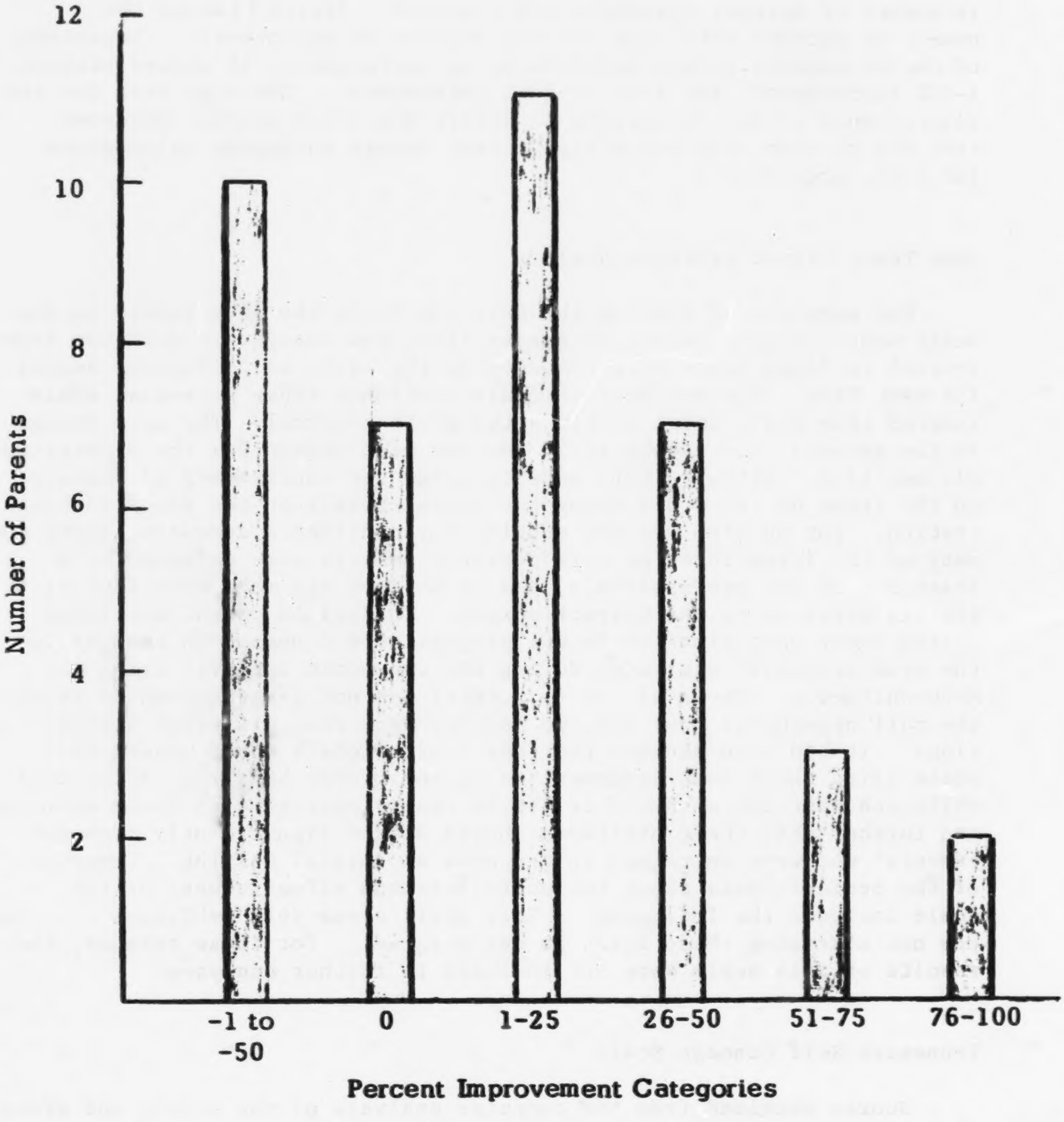

Figure 13. Distribution of improvement scores for 40 parents on Information Scale.

Teachers' Ratings

Table 20 gives the number of parents in each of the five rating categories at the initial and final rating series.

Table 20. Distribution of teacher ratings among 22 parents before and after training program.

Rating Category	Number rated initially	Number rated at end
Superior	0	3
Good	4	3
Average	2	7
Fair	10	6
Poor	6	3
	22	22

Approximately 60% improved by one or more rating points during their participation in the program, but the remainder did not change in rating category (one dropped by one rating point). These ratings were made on the basis of "total parent effectiveness" in handling the deaf child, and thus it is at best highly subjective.

Correlations

In an attempt to determine if the initial test scores on the Tennessee Self Concept Scale for Self-Criticism and the Information Scale could predict the success of the parent in the program, correlations were obtained between these measures and the teachers' final rank ordering of the parents in terms of total effectiveness as parents of deaf children. The Spearman rank order correlation coefficient between teachers' final rankings and the initial self-criticism scores of the parents was -.52 indicating that the final effectiveness of the parent could not be reliably predicted from the initial scores in this area. The correlation between the initial information score and the final ranking was -.02 indicating that parents' information about hearing impairments when they entered the program could not be used to predict their final effectiveness as judged by teachers' rankings.

The correlations of the teachers' ranking for initial and final series was .70 indicating that parents ranked effective at entrance into the program tended to be ranked effective at termination and that there were no dramatic changes in the rank order of parents from the beginning to the end of the program. In an attempt to determine if the teachers' rankings and the information and self-criticism scores were measuring the same characteristics, rank order correlations were obtained. The r_o for ranks and information was -.11 and the r_o for ranks and self-criticism was -.03, indicating that the teachers' ranks were not based on a personality variable nor on information about hearing loss.

Summary

In general, the findings indicated that the Home Demonstration Program produced a significant change in the parents' information about the audiological management and educational handling of the deaf child and in the parents' ability to sustain healthy self-criticism; however, the program did not significantly affect the parents' attitudes about the general handling of the child in the home nor their total self-concept nor their view of their family relationships. The teachers' ratings, which were considered to be the best overall assessment of the parents' effectiveness, were not correlated with the information or the self-criticism variables, indicating that some other basis was used for the ratings. The generally small differences in the rank order and the small improvement in rating categories from initial to final series indicated that the teachers in the program believed that parents who were effective before they entered the project remained so after their termination and that in general there was a slight improvement in the global aspects of understanding and dealing with their child's hearing impairment for all parents in the Home program.

The value of the Home Demonstration program cannot be adequately appraised by the instruments and measures utilized. The evaluation of such a project is difficult because of the lack of objective quantifiable measures in the area. Certain observations of a subjective nature have led us to believe strongly that despite the lack of objective evidence the program has much to offer parents. The parents themselves have responded very favorably to the project which provided them the opportunity for actual participation in the early training of their child. Teachers in the nursery program at the Hearing and Speech Center have noted that the children whose families have participated in the Home are more conscious of the role of audition in their child's development and they have a much better understanding of their child's handicap and their own role in his habilitation during his early years.

It is suggested that perhaps the instruments used for assessment were not sufficiently sensitive to detect the subtle but important changes affected by the program. Certainly the Attitude subscale of the John Tracy Clinic Scales appeared to be a non-differentiating measure. Several professionals in the area who completed this assessment commented that the questions were ambiguous and contingent on many

undefined aspects of the problem. Many of these individuals remarked that they felt that the scale did not evaluate areas of the program which they felt were important and that it did not properly reflect the philosophy of the Home or the type of instruction and guidance which was given to the parents. It is felt that the Tennessee Self-Concept Scale or any global measure of personality does not focus sufficiently on those aspects of personality which deal with interpersonal relationships, and especially with parent-child relationships, and is therefore of little value in assessing the effectiveness of a program designed to modify or develop attitudes in this area. It is concluded that in future assessment of such a program new scales should be developed which ask more specific questions which are more in keeping with the general philosophy of the project and that the failure of these measures to demonstrate significant changes resulting from the program reflects the inappropriateness of the scale rather than the lack of effectiveness of the Home.

Perhaps the most convincing evidence of the value of this program for parents can be evaluated only subjectively. The two personal experience stories written unsolicited by two mothers in this project and which are reproduced in Appendix B are examples of this kind of evidence.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The present project has successfully demonstrated that early intervention in childhood deafness can substantially reduce the degree of handicap in later years. Two major theses implied in the success achieved with children in the present study, however, must be considered when comparing results of this study with results and/or lack of results reported by other writers on the same subject. The first of these is that early intervention should have as its primary goal the implementation of maximum use of residual hearing from as early a period in life as is possible -- by one year of age or sooner. The second is that involvement of the parents is essential if one expects to obtain success with the first goal.

Major findings and developments from the three-year demonstration project which are considered most significant are:

1. Language Age growth was markedly accelerated upon entrance to the home program and in comparison to that for Performance Age and non-verbal Mental Age, both of which remained virtually linear.

2. Ability to use amplification from the wearable hearing aid improved dramatically for those children remaining in an acoustically oriented program after the home instruction period, as indicated by an improved mean threshold response to spoken voice of more than 20 dB.

3. The parents by virtue of their greater understanding of the nature of their child's problem from an early age were able to mobilize themselves into an effective community and state-wide pressure group, accomplishing improved legislation benefits for the education of preschool deaf children.

4. The project was viewed by the community to be an integral part of the services of the hearing and speech center to the extent that the Center's Board of Directors were unanimous in their support of the service after federal funds ceased. The program is now seen as a vital part of the Center's program for the hearing impaired child, who is seen first in the home, then in the nursery and kindergarten and thence to the most suitable educational placement. The recognition of the importance of this service was further demonstrated by a gift of $75,000 from a local philanthropist for purchase of a large residential lot and property adjacent to the Center and construction of a permanent model home for teaching parents of handicapped children. The present writers hope to extend this service to young children with other handicaps

involving development of language through the facilities of this new model home and provisions of the Early Childhood Education Assistance Act.

In addition, there are also important implications for the management of childhood deafness which have been highlighted by the results of the present study. First, not only must public education systems assume greater responsibility for the education of the very young hearing impaired child, but they must also rely upon the expert experience and knowledge of personnel outside education ranks per se. The use of the child's residual hearing is a goal which cannot be obtained without specialized help and personnel. Close cooperative relations with private agencies in the community may be necessary to take advantage of the expertise available in hearing and speech centers and in universities, for example, in the case of hearing impaired children.

Audiologists themselves will need to become more attuned to the special needs of the very young deaf child. Data have been presented in the preceding chapter which suggest that the younger the child, the more intensive the audiologic care required. In other words, the very young child needs to be seen by the audiologist almost as often as by the teacher who works with him and his parents. The vital role which the wearable hearing aid plays in the early intervention program makes the services of the audiologist on a regular basis mandatory. If public schools enter the field of deaf infant education, they will need to employ audiologists on the educational team.

Second, educational concepts for deaf children of school-age cannot be applied as a simple downward extension to include the infant and nursery-age child. A completely new kind of orientation to her role will be needed by the teacher, first of all, who must be able to work effectively in a non-teacher kind of counselor approach. She must focus on the parents since their involvement is crucial to the success of any program with a child too young to enter into a formal education experience. Further, the school system must be willing to remain flexible in its programming for such children, since working with parents in the home requires a non-school and non-clinic atmosphere. The teacher in these instances may never enter a classroom, in fact, but will do her work either through home visitation almost entirely, or through the model home prototype as was used in the present study. This kind of education specialist may require re-evaluation of teacher training principles in colleges and universities.

Third, both audiologists and teachers of the deaf should recognize the inherent danger of labeling early any young hearing impaired child with negative connotations regarding his ultimate hearing potential. First attempts to evaluate threshold generally suggest that all hearing impaired infants are more severely impaired than later measurements show for many of them. In other words, in the management of deaf children, the first evaluation is useful only if it is followed by frequent periodic evaluations, the results of which must be viewed as an aggregate. Present data have shown, for example, that in the group studied Language Age gain was not significantly correlated with initial hearing test results. This finding implies that regardless of the level of hearing obtained with an infant, he should have the benefit of wearable amplification on a trial basis. If he turns out to have better hearing than the first test suggested, he will make more rapid advancement in his ability to use the residual hearing. Should he in fact prove to be a profoundly deaf child, early hearing aid use may enable him to take better advantage of the feedback principle in monitoring his own vocalizations, even though intelligibility for speech is not possible.

In conclusion, the premise of the present study stated in the application in 1965 has in our opinion been shown to be a valid one. Stated briefly, it is that principles of child development dictate a deaf infant must be given the opportunity to use audition in as nearly as possible the same manner as the normal hearing child does if he is to benefit maximally from whatever residuum of hearing he possesses. Since it is hard to determine this level in infants, all deaf infants should be given the opportunity to hear through use of wearable hearing aids (binaural if possible) and consistent and continuing acoustic input from the beginning. The degree of benefit will remain in part a function of the degree of impairment. In any case, even the profoundly deaf child learns to attend, thereby developing early a communicative attitude which enhances either visual or auditory learning for the future.

APPENDIX A

Guidelines for Hearing Aid Management

General Hearing Aid Management Procedures with Young Children

Common Questions and Explanations

GUIDELINES FOR HEARING AID MANAGEMENT

1. HARNESS: The purpose of the harness is to stabilize and to protect the body of the hearing aid. The hearing aid should be enclosed within the cloth so that it cannot fall out, and there should be a hole for the microphone. The instrument should be worn outside the clothing and in the chest area as possible. If your child has two hearing aids, we have harness patterns for wearing two instruments. Harnesses can sometimes be purchased from hearing aid dealers but are usually more satisfactory if home-made. They should also be kept as clean as any other piece of clothing.

2. EARMOLD: The earmold should fit snugly so that it will not fall out without some stress. It is difficult to make earmolds to fit very young children, but it can be done. Ask to have another mold made if you feel that your child's mold does not fit properly or if the hearing aid whistles constantly. He will also need a new set about every 6 months because of the growth process.

   Keep the earmold clean. Use a pipe cleaner to clean out the canal hole. Unsnap the mold from the receiver and wash it with luke-warm soapy water at least weekly, but make sure that it is dry before resnapping it to the receiver. The hearing aid will appear not to work if the earmold is clogged with wax.

   If the earmold is broken, it should be remade. If rough spots appear on the mold, these can be buffed at the Center. Sometimes you can eliminate the problem yourself with an emery board; otherwise let us take care of it.

   If your child gets an ear infection, do not put the earmold in his ear. Also notify us as soon as possible since this may change his hearing levels. *** All infections should be closely followed by a physician.

3. RECEIVER: If the receiver is broken, a raspy sound may result. You may need to purchase a new one from a hearing aid dealer. Let us tell you what to buy.

   If the earmold does not fit snugly to the receiver, whistle or feedback may result. If you can put your thumb over the receiver hole and stop the whistle at volume settings 4-5, then put your thumb over the earmold hole when snapped to the receiver. If the whistle stops, then the contact between the cord, receiver, and earmold is a good one. If the whistle continues, notify us. If you have a good contact and feedback continues, the earmold may not fit properly or the hearing aid may be used at too loud a volume. Notify us of the problem in any case. All hearing aids will squeal or whistle periodically. For example, this will occur if the child puts the ear with the mold next to a wall, bends over and gets the mold too near the microphone, or sometimes even if he turns his head.

4. CORD: ALWAYS KEEP A SPARE CORD. A faulty cord will make the hearing aid appear not to work or to have a raspy sound. Do NOT tie knots in the cord. This will cause breakage as will a yank or snag. To determine a faulty cord, put the receiver in your ear and wiggle the cord. You may find where the break occurred. Cords can be purchased from a hearing aid dealer in various lengths, and we will tell you what to buy.

5. BATTERY: ALWAYS KEEP SPARE BATTERIES. In placing the battery in its compartment, match the positive or plus ends. If the hearing aid does not work, always try a fresh battery first. It will last from 1-2 weeks. Take it out of the hearing aid when not in use, at night for example. If it is left in the compartment for a long period of time, it will corrode. You can purchase batteries from any hearing aid dealer nearest you. Do not plan to buy them at the Center because the supply is low.

6. HEARING AID BODY: Avoid excessive heat or moisture. Be gentle with the hearing aid. It is a mechanical device and like an appliance, will break down and need repairs. If the microphone case is loose, the hearing aid may rattle when shaken. If there are broken parts such as a receiver, they must be replaced.

   The tone control switches are different for different hearing aids. Ask your audiologist or teacher where you should wear it. In most cases, the volume control should be about mid-way. If you are not sure where your child should wear his controls, ask the audiologist. If your child has the hearing aid turned up louder than usual, the battery may be low.

   A "T" position means telephone. The child will get no sound in a normal speaking situation if the hearing aid control is on "T".

   Do not ever open the case of the hearing aid. Only an expert should do this and doing so may void your service guarantee. It may also cause expensive damage. If you wish to see inside the inner workings of the instrument, ask your hearing aid dealer to show it to you.

7. FEEDBACK: When sound does not go directly into the child's ear, it may leak out around the receiver or earmold and return or "feedback" to the hearing aid microphone. This causes what we know as squeal or whistle, also called "feedback". The amplified sound is reamplified. Causes of this are poor connections somewhere between the body of the hearing aid and the ear canal or volume setting at too high a level. Probably the most common cause is a poorly fitted earmold. We can alleviate this, but may not be able to eliminate it completely.

8. "LOANER" HEARING AID: A "Loaner" hearing aid is one that we loan to you until your child's permanent hearing aid is recommended or while it is being repaired. Many children have to wear "loaner" instruments for several months before an appropriate one is decided

upon. This is to your child's benefit and also to your benefit financially. Do not get anxious about his permanent recommendation, because it will be taken care of as soon as possible.

While wearing a "loaner", you will be held responsible for the return of the instrument in good working condition. If any parts are lost or broken, you will be expected to replace them or to assist us in replacement. You will also be expected to purchase the batteries and earmolds necessary.

When a permanent hearing aid is recommended, it is your responsibility to purchase it as soon as possible. We need our "loaner" instruments for use with other children.

9. LISTEN TO YOUR CHILD'S HEARING AID EVERY MORNING before you put it on him, and you will be able to pick up many of these problems before they become serious difficulties, causing your child a delay in amplification. If a hearing aid does not work properly, a child should not be asked to wear it.

10. YEARLY RECHECKS: Your child should have at a minimum a yearly check of his hearing levels and his hearing aid. Even after he leaves the educational settings here at the Center, you should be certain that he receives this.

11. QUESTIONS: If at any time you have a question about your child's hearing levels or hearing aid, please feel free to ask. In many cases, we cannot test a young child in as much detail as we would an adult, but we will be happy to discuss whatever results we have with you.

GENERAL HEARING AID MANAGEMENT PROCEDURES WITH YOUNG CHILDREN

1. First Examination - AFTER A LANGUAGE EVALUATION HAS BEEN COMPLETED, THE HEARING LOSS DIAGNOSED, AND THE PARENTS INFORMED AND COUNSELLED ABOUT THE PROBLEM
   a. Make earmolds for both ears (usually soft plastic since it adheres well) CCS will only pay for 1 mold. Start off with the idea of binaural aids unless indications prove otherwise would be better.
   b. Re-interpret Audiogram.
   c. Introduce the hearing aid to the parents and the child.
   d. Discuss what a harness is and give them the pattern.
   e. Explain the purpose of their next visits with you including loaner aids, HAE, what to expect and not to expect.
   f. Test unaided again to further substantiate results of language evaluation.

2. Second Examination
   a. Instruct parents in manipulation of loaner hearing aid - test them.
   b. Instruct parent in introduction of hearing aid at home.
   c. Introduce loaner hearing aid to child and send it home (with their molds).
   d. If possible, do a rough test while the child is wearing the aid.
   e. Give the parent the sheet on hearing aid management.

3. Third Examination and Beyond
   a. Answer the parents' questions.
   b. Assist the parents if they have had a problem getting the aid on the child.
   c. Begin the formal HAE or HAS. - Use all hearing aids unless the child is on CCS.
   d. Vary your loaner use from time to time.
   e. Use all of the stimuli available whenever possible.
   f. As the child approaches 2 years of age, begin conditioning procedures.
   g. Don't drag the HAE on unless absolutely necessary.
   h. If you do not have loaner aids available for take-home use, the dealers in the area will often give aids for clinical use. Use these with the child and then make your HAE a quick estimate of the child behavior with amplification period rather than a detailed differentiation between instruments.

COMMON QUESTIONS AND EXPLANATIONS

A. INITIAL CONSULTATIONS

1. HA is not the answer to the deafness: Most of the parents think that as soon as they get the hearing aid, their child will begin to hear sounds, speech and soon talk. Compare using a hearing aid to putting one ingredient into a pie; alone it doesn't make the whole. That is the reason why the sessions at the Home are so important; they are the rest of the ingredients. That is the reason why we will later recommend that your child attend a therapy or nursery group and later school - the child will not learn to talk unless he gets the combination of a hearing aid and something else - proper training. Neither can accomplish the task alone. Since your child is so young, the training is for you so that you can best help your child during his first years of sound. HE IS A BABY FIRST AND A DEAF BABY SECOND. The Home is designed to train you in the best way to work with him as a baby.

2. Your child will hear sounds with his hearing aid but will not understand them for a long time. There is a big difference between hearing and understanding. For example, if you were in Greece, you would hear everything that they said to you but you would not understand anything. This is the way that the hearing aid sounds to your child. He might hear you talking or hear the sound in the house, but they have no meaning for him yet. Only after a long period of learning what sound means will he begin to learn what speech means, and after that he will begin to say some words. A NORMAL HEARING BABY LISTENS A WHOLE YEAR BEFORE HE BEGINS TO SAY MA-MA. Therefore your child's listening year begins today and you cannot expect him to even try to say even simple words until at least one year from now. He will have to store up a lot of sounds in the back of his mind before he can learn to use them.

3. An operation will not help your child's hearing loss. Usually take out the picture of the ear or draw a simplified version to explain why. If they have not been to an ENT man yet, they should go. If they ask about Dr. Shea, suggest that they call him before making the long trip to Memphis. We will send the child's records before they call so that he has them. Do not discourage the trip if they still want to go.

4. You will not see a big change in your child's responses to sound at home with the hearing aid on. He doesn't know what sound is yet, and therefore will not know how to react to it. Don't test him or call his name because it has no meaning for him. All you should concentrate on at this point is getting

the hearing aid on him. All it brings him is noise and he will learn later what this noise is. If you feel that he hears a sound, reinforce it by a facial expression and putting your hands to your ears but do not constantly look for responses. He will have to learn to have some sounds to concentrate on in the foreground and block some out into the background as you and I do - give example of a sound they're ignoring.

B. PROBLEMS WITH THE HEARING AIDS

1. If the parent cannot get the hearing aid on the child during the first 1-2 weeks. They would make him take medicine if he had to have it so they have to make up their minds that he is going to wear it no matter what. Usually they are not themselves convinced or they are scared. Tell them that they have to show the child that they are boss and will only take it off when they are ready. Sometimes the parents will get the aid on for ½ hour and then cannot work up to all day. Use the same philosophy and insist. Some parents do well if you give them a definite assignment such as 2 hours, 3 times a day this week and write down the hours he wears it and bring it next week. Usually if you still continue to have problems, you have to investigate the parent's desire to make the child wear it - do you feel that your child needs a hearing aid?

2. The child shakes or blinks to the amplification when you put the HA on. Tell the parents to wear the volume control on a low setting or try a moderate gain HA first, but usually the child will adjust to the strong gain HA immediately within 1-2 weeks and this behavior will cease. Do not concern the parents with it because they're already wrecks.

3. After wearing the HA for 3 weeks or longer, the child continues to make no response to sound. In most cases where the children appeared to not hear anything even with an aid, they eventually began to show responses aided (still none unaided). Even if this is vibratory, that is something he will be able to make use of and as the child gets older, he may have more hearing than he is able to acknowledge now. Certainly, do not stop hearing aid use or testing. Many of these kinds of children are now wearing binaural aids.

4. Parents will report that their child is really responding at home. Try not to discourage them completely but explain the difference between responses to auditory and visual clues. Secondly, they will report words that he is saying at home. Most of these are simple vocalizations that approximate "b" or "p" or "m" words and excite the parents. Tell them how glad

you are and remind them that a hearing child would not be talking that soon. When the child's vocabulary does not widen, it will dawn on them that those first words were not really that.

5. The child will not stop vocalizing at home or in the test session. There is no way to stop it; you and the parents have to tolerate it. Sometimes you can show the child not to move his mouth until he hears but generally he will "ba-ba-ba" whenever you go out into the test room.

6. The harness may be too low (stomach), too high (shoulder and tremendous feedback), too loose (HA flops around) or inside their clothes. It should be in the shoulder area and molds will have to be remade until binaural users can have the HA on the same side as its ear and no feedback is experienced. At the beginning however, have the HA on the opposite side as its ear so that some of the feedback can be avoided. If the patient is an infant, they may want to put the aids on his back while he crawls but otherwise on the front and on the outside. Outside is suggested because of the fact that the child cannot tell the difference between clothing noise and speech and you are just giving him extra sounds to learn to make use of.

7. The earmolds never seem to fit. On the really small children, this is a constant problem. Continue making them indefinitely and eventually they will work. Those with lengthy canals are the best; helix or not makes little difference. Warn the parents about this at the beginning and they will not be surprised when you have to remake them 50 times.

8. Some loaner HA cords are too long. Wrap them around the harness straps.

9. Tell the parents at the beginning that they will be expected to buy their own batteries.

10. Try to get the parents not to depend on the numbers of the volume control and to turn the hearing aid just below the feedback.

11. Receiver savers are good to use.

12. Do not be concerned if the child's hearing varies 20 dB. With this age group, that doesn't necessarily mean that their sensitivity has decreased. Certainly, recheck him soon to see - an average of responses usually indicates no real change.

C. PARENT HANG-UPS

1. The audiogram - go over it many times, at least every 4th testing session. They never really understand it and should. Give them a few to take home.

2. Bone conduction testing. This question always comes after the parent meeting where they hear a physician talk of operations. Tell them that we know their child's problem is a nerve loss because of the severity of the loss and because it has caused a delay in speech and language acquisition. We don't have to always test it to know that the loss is a nerve one. When the child can cooperate satisfactorily for b/c testing, we let the parents hold the vibrator and feel the vibrations so that they can understand why some responses are obtained in the low frequencies.

3. Some parents always want to buy a 100p system for their home. Try to discourage this and ask them to wait until the child is old enough to be able to benefit from this, training-wise. Some go ahead and do it anyway. If they want to buy a battery tester, that's probably a good idea.

4. After a few weeks of HA wear, the child stops responding. Explain this as a plateau of response. If we responded to every sound that we heard we'd go crazy. The child has adapted some sounds and is storing them up even though he will not let us know that he is. Don't force a response to everything. Children get tired of little games as they mature. This does not mean that his hearing is worse.

5. The child no longer responds to sound without his aid; is the hearing worse? He is learning to depend upon his hearing aid and that is what we want him to do. He should not be without his aid during his waking hours.

6. The child responds better to sound without his aid; is it making his hearing better? He is simply more aware of what sound is and what it can do for him - he is listening harder. He should not be without it even in these cases.

7. These questions will crop up again and again:
    - hearing vs. comprehension
    - why isn't he talking yet - when will he start saying words
    - feedback and earmold fit

D. PERMANENT RECOMMENDATION OF HA

1. Binaural hearing aid vs. monaural HA vs. Y-cord HA

   This is something that should be explained to the father primarily because they can understand it better and it is their money that is buying the aids.

   A monaural HA is one-ear listening. Everything that the child hears will seem to come from that direction.

   A Y-cord fitting is still monaural listening. Example: monaural record player with one groove record and monaural needle can have 12 speakers but is still sending the same sound to every speaker. Both ears get the same sound - no differentiation of direction and less quality. Both ears must be identical to use this fitting. Also, slightly less power reaches the ears.

   Stereophonic listening is achieved with two hearing aids. Each ear has maximum power. Hopefully, like a stereo record with two grooves and a stereo needle, the quality of sound is greatly enhanced and the child can tell the difference between the sounds at each speaker or tell directional listening. This is the best that we can offer for a deaf child and if he can learn to use this kind of listening early enough in life, it will show up in helping him achieve his greater potential orally.

2. All new hearing aids squeal. Warn them of this. Make new molds as soon as they get their own aids.

3. Tell them that their child needs a recheck periodically depending on the child's age. Tell them to be responsible for this.

APPENDIX B

Excerpts from Taped Interviews with Parents and Children from Home Program

Personal Experience Stories by Two Mothers

Excerpts from Taped Interviews with Parents and Children from Home Program (Arranged in order of age of child, oldest to youngest)

Transcription: Ray Age 5-9

Mother: Let's find something to talk about, oh look!
Ray: A bike.
Mother: Can you find a bike like yours?
Ray: A bike has wheels, a seat, handle bars, chain, horn.

Mother: Do you have a horn on your bike?
Ray: No, turn (referring to the page).
Mother: Let's find something else.
Ray: Football, you hit the ball, you go down and win the game.
Mother: What is this, what is this?
Ray: Pool, pool.
Mother: Yes, a pool table
Ray: Pool table.
Mother: Do you know how to play? How do you play?
Ray: You have sticks and you shoot that ball and it goes down the hole.
Mother: Do you know somebody who has one?
Ray: Mr. Jim.
Mother: Who has one like that?
Ray: Mark, he's a cowboy.
Mother: Where does he live?
Ray: Across the street, his name is big Mark. He has a playhouse, high.
Mother: Let's find something else.
Ray: I see something. Look! What is that?
Mother: Oh my goodness what is that?
Ray: A man.
Mother: What happened?
Ray: Burned the house down.
Mother: And what did the firemen do?
Ray: Water, put the fire out.
Mother: Did they put the fire out?
Ray: Uh-huh.

Ray: Where is Miss Janet?
Mother: She'll be back in a minute. Can you tell me what you did in Sunday School yesterday?
Ray: We prayed, prayed, Sunday School.
Mother: Did you sing a song about Jesus?
Ray: "Jesus love me" (child sings).
Miss Janet: Come here Ray, sit on my lap. Tell me your name.
Ray: My name is Ray.
Miss Janet: Ray what?
Ray: Ray Pillows.

Transcription: Tommy Age 5-0

Mother: We're gonna talk to Robin, can you say hello?
Tommy: Hello, Robin.

Mother: Where is daddy?
Tommy: Daddy work
Mother: Where is Suzy?
Tommy: Suzy school.
Mother: Where is Kent?
Tommy: Kent go home.
Mother: Let's look at a book; what is that?

Tommy: This is a train, fishes, taking bath.
Mother: What is this kitty doing?
Tommy: Kitty running football.
Mother: Can you tell me all those colors?
Tommy: Black blue yellow orange green black--pink grey red blue--red one.

Mother: Oh boy, what's that?
Tommy: Ice cream truck
Mother: How many applies?
Tommy: One - two
Mother: How many do you see?
Tommy: 1-2-3-4-5-6-7-8. Look out, kitty.

Transcription: Phillip Age 5-0

Mother: What is your name?
Phillip: Phillip.
Mother: Your name is Phillip, Phillip what -- what is my name?
Phillip: I don't know.
Mother: Yes, you do know.
Phillip: Becky Bagwell.
Mother: Yes, my names is Becky Bagwell. And your names is what?
Phillip: Phillip Gober.
Mother: Let's look at the book, what is that?
Phillip: A motorcycle.
Mother: A motorcycle. Do you have a motorcycle?
Phillip: No, me want to hold it. Where it go, mama wait, baby sister.
Mother: Is that the baby's?
Phillip: You got one, baby sister.

Mother: What does Dina do?
Phillip: Play.
Mother: Where does she play?
Phillip: I don't know.
Mother: Does she play in her swing?
Phillip: Her play in her swing.

Mother: Do you have some pants like that (pointing to picture)?
Phillip: Me got that one, me want long pants.
Mother: You like long pants.
Phillip: Not cut off.
Mother: You don't want me to cut them off?
Phillip: No.

Mother: How many motorcycles are there?
Phillip: One-two-three, bus school green, that one daddy, that a race car, that mine.
Mother: Does a race car go very slow?
Phillip: No, very fast (rhrhrhrh). Mama (child yawns), I want turn off this one. I want that one and that one.

Mother: What do you want for lunch?
Phillip: Not a hamburger.
Mother: What kind of sandwich does Phillip like?
Phillip: I don't want to talk.

Transcription: Paula Age 4-11

Mother: You hold the microphone so you can talk. Can you talk? Talk in the holes. How many holes Paula, can you count the holes?
Paula: One 2 3 4 5 6 7 8.
Mother: 8 holes, Paula, where is your daddy?
Paula: Daddy at work.
Mother: Are you sure?
Paula: Yea, mama will you turn that back, turn that back, turn that back.
Mother: Oh you want to turn the tape recorder off?
Paula: No.

Mother: Who comes to school with Paula and Miss Janet?
Paula: Tommy, Phillip, Claudette and Ronnie Brown.
Mother: Let's look at the book, Paula.
Paula: And we talked about the book, toys.
Mother: Yes, we will talk about the book and the toys. Let's turn the page.
Paula: I don't know that.
Mother: That's an alligator. What is the alligator doing?
Paula: Riding in the airplane.

Paula: That's an alligator.
Mother: What's the dog doing?
Paula: Painting.
Mother: What color?
Paula: Blue, and red, don't tell me what color, red blue and yellow.
Mother: What did you do at Mrs. Smith's (child's babysitter) this morning?
Paula: I eat a sandwich.
Mother: You ate a sandwich. Was it good?
Paula: Yea.

Mother: What kind of a sandwich did you eat?
Paula: Cheese and bread and I ate milk.
Mother: You did? Who else ate a sandwich?
Paula: Smith.
Mother Did Smith eat a sandwich?
Paula: Yea, Lisa was in bed.
Mother: Lisa was in bed? Where was Todd?
Paula: He was with his mommy and daddy.
Mother: Can you tell me where Aunt Billie is?
Paula: At work.
Mother: Do you like Aunt Billie?
Paula: Yea.
Mother: Where did you, Aunt Billie and Mamma go?
Paula: To Florida.
Mother: What did you do in Florida?
Paula: Swimming.
Mother: You did? Did you have a good time?
Paula: Yea, I swim swim swim.
Mother: You swim swim swim.
Paula: Miss Janet, I swim in a swimming pool.
Mother: Paula, do you like school?
Paula: Yea.
Mother: You do?
Paula: Mama, yesterday Phillip talked with his mama.
Mother: Yesterday Phillip talked with his mama. Was he a good boy?
Paula: No, he didn't get no candy.
Mother: He didn't get any candy? Why?
Paula: Cause he wasn't a good boy. His mama won't let him get no candy.
Mother: He wasn't a good boy so his mother wouldn't give him any candy.

Mother: What happened to your baby?
Paula: It boke its leg.
Mother: Who broke your baby's legs?
Paula: Sonny.
Mother: What did you say to Sonny?
Paula: I say, Sonny, you boke my baby's leg.
Mother: You said, Sonny you broke my baby's leg. That wasn't nice, was it? That was ugly.
Paula: Mama, he didn't mean to.

Mother: You played with a typewriter?
Paula: Yes, yesterday I did it, didn't I?
Mother: Where do you like to go to eat?
Paula: Krystal and Shoney's.
Mother: What do you eat when you go to the Krystal?
Paula: I eat hamburger and French fries and tomato ketchup and a coke.

Transcription: Dianna Age 3-10

Mother: I don't want the baby. You play with it. Tell her not to cry.
Dianna: Don't cry.
Mother: What'd you do?
Dianna: Baby.
Mother: She'll cry again. Say "rock-a-bye the baby"
Dianna: Rock a bye the baby. Rock the baby.
Mother: Oh, look at her leg got all twisted.
Dianna: Put on the floor.
Mother: No, she'll cry.
Mother: Did you spank her?
Dianna: Yes
Mother: Poor baby.
Dianna: Don't you go crying.
Mother: Poor baby.
Dianna: Lay down.
Mother: Your're a mean mommy. Let's make another house.
Miss Janet: Hi, Dianna. Whatcha doing?
Dianna: Look at my picture.
Miss Janet: Who is that?
Dianna: Dianna.

Teacher: You were painting the box? What color was the box?
Dianna: A box.
Teacher: What color was it -- red? No? Was it blue? No? Was it orange? Yes - it was pretty. Where are you going today?
Dianna: I'm making a house.
Teacher: Your're making a house?
What kind of a house? What are those?
Dianna: Windows.
Teacher: What's this?
Dianna: A door.

Teacher: You want to go home? Where's Galen?
Dianna: In school.
Teacher: Your're going to be a Christmas angel.
Dianna: Mommy can angel.
Teacher: Mommy can't be the angel.
Dianna: Dianna is the angel.

Personal Experience Stories by Two Mothers

JIMMY

Jimmy is our two (2) year old son. He has an eight (8) year old brother, Mike, and a six (6) year old sister, Jenny. Jimmy is alert energetic, curious and lovable. Jimmy can be devilish one minute and the next a perfect cherub. Jimmy is the source of much laughter and great joy in our home. Jimmy is like any typical two (2) year old, except for one thing; Jimmy is DEAF.

I do not like the term "DEAF." It is defined as "one who is unable to hear." Jimmy, like the majority of so-called "deaf" children, does hear some sounds. He uses his two (2) hearing aids throughout his waking hours, and with them he misses very little.

Hearing did not develop in Jimmy as it does in a normal child. From the day a hearing child is born his little ears are bombarded with his own voice and all the other voices and environmental sounds around him. In a short time, because of the constant repetition of these sounds, he begins to make babbling sounds.

A baby with a hearing loss usually babbles the same sort of sounds until he is about seven (7) months old. This is the age at which the normal hearing child will delight his parents with his first attempts at "mama" and "dada". The deaf child's vocalizations taper off. It is felt the reason is that he does not hear himself, or his family, or the sounds around him. He has little or no feedback of sounds to use to make further progress.

Six years old! Many in our society consider this the "MAGIC" age - the child is now ready to begin his education. For the child with a hearing impairment, it is the "TRAGIC" age - if his education has not begun many years before. His critical years for language acquisition are lost. His potential for intellectual development may never be realized. His chances to become an emotionally stable, independent, and useful citizen are highly improbable.

During the first trimester of my pregnancy with Jimmy I had mumps and then German Measles. I was aware of the extensive damage this could cause. At birth my pediatrician and obstetrician assured me he appeared to be a very healthy, normal baby. I realized they were not yet able to give me the same assurance concerning his sight, hearing, or if there had been brain damage. At six (6) weeks an ophthalmologist examined his eyes and said there had been no damage.

I was told that the earliest I could have his hearing checked was at eight (8) months. (A competent audiologist can test hearing at birth, and a very accurate testing can be made at three (3) months). I cannot stress strongly enough the importance of early detection with the proper follow up. When Jimmy and I went for our appointment with the audiologist I was very optimistic. I was not then aware; like most "deaf" children, Jimmy had some hearing. He gave a beautiful reaction when a door slammed. I did not know that the times when we thought he was responding to our voices, it was his alert little eyes that had detected our presence. When we'd sneak up behind him and call his name he'd turn to us - he had not heard us, he had felt the vibration of our footsteps. After the testing the audiologist told me he had a severe bilateral (both ears) sensory neural (nerve) hearing loss. At ten (10) months he was retested. Jimmy was fitted with an aid with a Y cord to both ears. After this we asked, "What do we do now to help Jimmy?" We were told to wait till he was three (3) years old and enroll him in a preschool for the deaf. This advice wasn't as bad as the prominent otologist's who told us to wait till he was five (5) years old, that he didn't believe anything these audiologists said about young children.

As a registered nurse and a mother, I was well aware of the importance of these early years to any child, and knew the particular importance they would hold for a handicapped child. We made a thorough investigation of the facilities available in Kentucky. There was no one to guide us. The shock we felt when we learned of Jimmy's handicap was not nearly as great as the shock we felt when we learned there was no one in Kentucky to help us.

For seven (7) months we wrote letters, talked to other parents of deaf children, and read everything we could find on education of the deaf. In February of 1968 when Jimmy was fifteen (15) months old and becoming more and more silent, an issue of The Volta Review arrived. It is published by the Alexander Graham Bell Association for the Deaf in Washington D. C. (Incidentally, a person involved in the hearing field told us not to subscribe to this magazine because it was above us. My husband's reaction to that confidence instilling statement was, "It might be above him, but it's not above us!")

An article described a program for the deaf child under three (3). Its purpose was to teach the family how to encourage speech and language in the home, where the very young child spends most of his time. It was the Home Demonstration Teaching Program at The Bill Wilkerson Hearing and Speech Center in Nashville, Tennessee. We knew immediately this was exactly what we had been desperately searching for since we learned of Jimmy's hearing loss. Within two (2) weeks we made arrangements for our first visit to the Center.

Jimmy's hearing was thoroughly evaluated by a pediatric audiologist. She recommended binaural amplification, (a separate aid for each ear). This gives the child a closer approximation to the way that we hear - with two completely separate ears. Did it ever occur to you that Mother Nature gave you stereophonic hearing?

When Jimmy had been fitted in a shoulder harness with the two aids his immediate reaction was something to behold. He began to make vocal sounds he had never made before -- O's E's I's and etc. When sounds were made with different little noise-makers his little eyes darted till he found the source. It was a beautiful experience for all of us.

We were then introduced to our teacher. (All of them are well qualified teachers of the deaf). She took us to the Home for our first visit. (The Center rents a home, located a single block away, for this project.) This is where the teaching takes place - just as when we returned to our home we would be able to carry-over the instructions there. (In some areas in the United States, the teacher goes directly into the individual's home to do the teaching.) We were taught how to use common everyday household activities to develop Jimmy's speech and language.

The purpose of the program is not to make parents teachers of the deaf, but to use the parents' natural way of stimulating and responding to their child. We were taught that in order to encourage Jimmy to listen we must make it fun to listen. We listened together, to train whistles, to music, to the siren on the fire engine, to the jet up in the sky, to duck calls, to bells, to blocks banged together, and most important to voices. And it began to work - Jimmy was more and more aware of the sounds around him.

It was like a miracle unfolding before our eyes. How wonderful it was for us too - we were able to help our son and knew we had the guidance needed to help him in the right way.

We have continued to make the trips to Nashville. We try to go once a month. We stay one to three days. (If we lived in Nashville we would make weekly visits.) It is a financial burden, and a tiring trip, but it's well worth it. Of course, there are many other families in Kentucky who simply could not afford it, no matter how willing they were to make the sacrifice.

I feel you would be interested in the progress Jimmy has made in the past year and a half.

March 6, 1968

Jimmy - fifteen (15) months old - He was basically a silent child. He was wearing one aid with a Y cord.

AUDIOLOGICAL REPORT
(without aid)

250 Hz	No response at	75 dB
500 Hz		85 dB
1,000 Hz		100 dB
2,000 Hz	No response at	100 dB
4,000 Hz	No response at	100 dB
Live Voice Awareness		80 dB
With one aid	Approx	50 dB

We were told by audiologists in Louisville and Nashville that there were indications that there was an even greater loss in his left ear.

May 14, 1969

Jimmy - two (2) years old - Testing was a problem because Jimmy was talking so much. He was now using two aids.

AUDIOLOGICAL REPORT
(without aids)

250 Hz	70 dB
500 Hz	50 dB
1,000 Hz	70 dB
2,000 Hz	60 dB
4,000 Hz	70 dB
Live Voice Awareness:	
Right Ear	45 dB
Left Ear	55 dB
With two aids	15 dB

We know Jimmy's hearing has not improved, but his ability to listen and the use of binaural amplification has. We are convinced this is the reason for the improvement.

Jimmy is making steady progress. In some language areas he is only six (6) months behind a normal hearing child. His vocabulary consists of more than 50 words. He uses many phrases and is beginning to combine words into ideas. For example - There's Mom's car, Daddy go by-by; and our favorite happened at supper recently. His brother, Mike, finished his iced tea, Jimmy noticed it and said in his beautiful little voice, "Mike's cold tea all gone -- By-by Mike's cold tea."

Although not all of his speech is completely clear, the words he uses most often are understandable. It is clearly felt by the professionals who are involved with Jimmy that he not only is imitating our voices, but is imitating the inflection of our voices which is producing a very natural sounding voice. They also feel he will soon advance to using clear two and three word phrases and simple sentences.

If our family had not been able to find and participate in this early training program Jimmy would be a very different little boy. It is very likely he would not be able to make any speech sounds other than grunts and groans. He would be using gestures in a desperate attempt to try to communicate his needs. Because of the frustration he would have to endure there would be behavior problems.

He would be a very discouraged, unhappy little fellow. We, in Kentucky must provide the early education these babies need.

We want a successful program. This would depend on the following:

I Early detection and referral to the program.

II Prior to the educational program there must be a complete medical, otological, and audiological examination of the child, plus a clinical psychological examination, if there is a question of disability beyond a hearing loss.

III The teachers in the program should hold current certification as teachers of those with hearing impairment and have experience working with the very young child.

IV The parents must receive individual guidance in order to maintain a reasonable degree of consistency in communication, discipline and interaction with their child with impaired hearing.

All over the country people are realizing that lack of attention to the early years of a handicapped child can lead to irreversible deterioration of his potential for the future.

Research by Dr. Benjamin S. Bloom, of the University of Chicago, indicates that at age four (4) a child has already developed 50% of his total intellectual capacity. The National Advisory Committee on Handicapped Children, reporting under congressional mandate, called for the development of these early training centers, because of the importance of the early years.

This led to the passage of Public Law 90-538, "The Handicapped Childrens' Early Education Assistance Act." This Act authorizes the Commissioner of Education to arrange with appropriate public agencies, and private non-profit organizations, for the development and carrying out by such agencies and organizations of experimental preschool and early education programs for handicapped children. Ten million dollars should be made available in the fiscal year 1970 and twelve million in 1971 for these programs. Kentucky should certainly explore the possibilities of receiving financial aid for one of these programs for our State.

Listening and talking are so much a part of everyday life that most of us take it for granted. Outsiders seem to look on deafness as the gradual and partial loss of hearing that comes with advancing age -- the kind of deafness that bad jokes are made of. We must make the public aware that the baby who is born with a hearing loss, but otherwise normal, faces a burden of staggering proportions. The most serious effect is its interference with the normal development of language which is the means by which we obtain all human thought and learning.

We know of many families who have left Kentucky because of the lack of good facilities for the Deaf. We have asked many professionals involved in speech and hearing in Kentucky for advice as to Jimmy's future education. Without exception they advised us to leave the state or to send him to an out-of-state residential school. (This would be at three (3) or four (4) years old, when a child most needs the love and security of his family.) We love Kentucky. We do not want to leave. We know Jimmy has a long upward climb ahead of him but we will always be there to give him the love, the help, and the encouragement he needs. We feel that the people of Kentucky will respond to the vital need of all the other little Jimmys and Janeys throughout our state and provide them with the foundation in early education they must have.

Helen Keller said, "I have found deafness to be a much greater handicap than blindness. I have come to regard hearing as the key sense. That is the door that opens most readily on knowledge, because it is largely by listening to their parents that children learn."

We must provide the help these little ones need to open the door to learning.

Unsolicited Manuscript

by a parent

"This just isn't my day," I thought as I dragged the children out of bed. First of all I overslept, then I discovered I had to iron a dress to wear. After about fifteen "eat your breakfasts" and twenty-five "brush your teeth," we were finally dressed and ready for school. I delivered my eight year old and was driving my five year old to kindergarten. Everything was calm as could be when suddenly he patted me on the shoulder and said "Mommy, I love you a whole bunch." My heart almost stopped as I realized I had just been rewarded for all my years of running, working, and frustrations. You see my son is partially deaf.

In December, 1965 just before Ray's second birthday we decided that he could not hear. We made an appointment with an ear specialist. The doctor confirmed our fears. Our son was deaf. Some hearing was restored with surgery, but he still had quite a hearing loss. Naturally my first question was "What can I do for my son?" I was told to wait until he was six years old and put him in an institution. Fortunately, I did not take this advice. Instead I inquired about other doctors. Six months later I found one who sent us to the Bill Wilkerson Hearing and Speech Center. Here Ray was tested and we were told just what his hearing loss was. He was fitted with hearing aids and enrolled in the Center's Home Demonstration Program.

When we first took Ray to Bill Wilkerson, he was 2½ and did not say one word. Each week I drove 100 miles for our class at the home. They taught me how to teach my son.

We had been in the Home Program for only a short time when we were asked to attend a parents' meeting. This first meeting helped me more than anyone could ever know. You see even though I had been told by experts that my son would never have normal hearing, I had not quite accepted this. At this meeting I met other parents and for the first time I felt that I was not alone. After hearing about some of their children's problems, I found myself thanking God for what little hearing Ray had.

For months Ray and I made our weekly visit to the Home. We spent hours each day working together. At times I became so discouraged I would go to my room and cry. I cried a lot in those days. We matched colors, found things that were alike and I talked. I must have said "milk" a million times. Then one day when he finally imitated "milk" for me I must have been the happiest person alive. Then when he came to me and said "milk" on his own I actually glowed.

In February, 1967 we decided to move to Nashville. Ray would be ready for the daily nursery program in September and it would be impossible to drive in everyday. This is one decision we've never regretted.

As it turned out Ray was able to enter a daily program in June. He could say about 25 words by now, spontaneously. I thought this was pretty good until I heard some of the other children. I became discouraged again. I soon decided that feeling sorry for myself sure wasn't going to increase his vocabulary. I would just have to work harder. I bought books about everything. We went to the park and talked about all the things we saw. We went fishing, swimming, boat riding, anywhere to give us something to talk about. Ray's vocabulary grew by leaps and bounds. Then we would reach a standstill. I'd just have to find something more interesting to talk about.

After a year in nursery school at Bill Wilkerson, the teachers decided that Ray would be placed in kindergarten with normal hearing children. I was pleased that they thought he could fit into a group like this, but I was rather apprehensive about it. As it turned out, he really blossomed. He learned so much from the other children. He had to talk. The children paid no attention to his jestures, so it was talk or be left out and he talked more everyday. Ray's vocabulary improved from 2 yr. 6 mo. to 4 yr. 9 mo. in less than a year. Besides kindergarten he received one hour, four days a week, group therapy at Bill Wilkerson. He is still in this type program and I can see improvement all the time.

I'm not trying to say that our work, worries, and frustrations are over. Ray will be going into first grade next school year, and I know that there will be problems, but when I hear him say "Mommy, I love you a whole bunch," I know we will make it.

Being a mother is a very difficult job. It's the most responsible position any woman can hold. So much depends on the right decision at the right time. We are molding tomorrow's society. So many times I wonder if this is the right way to teach a certain concept on life. Am I too strict or too lenient. Who actually knows? Being the mother of a hearing impaired child is even more difficult. With normal hearing children we tend to take so much for granted. We just expect at a certain age they will start talking, then in time they make sentences. With a hearing impaired child you cannot afford to take anything for granted. It takes constant repetition of each word for them to learn even the most simple sounds. The work is never easy, but the rewards are great. The closeness of working with the child makes you so aware of each new sound. If he hears a new sound or makes a new sound it makes weeks of work worthwhile.

When I was younger, I dreamed of a career. Then when I quit work to care for the children I felt for a time that my life was just wasting away. I asked myself, "What am I accomplishing?" At times I felt totally worthless. I was in a rut doing nothing important, I thought. Now I realize I do have a career, and a most important one. The pay isn't very much, but the fringe benefits are worth more than all the money in the world.

Accept your child for what he is, not for what he might have been. Unless parents truly accept a handicap, the child will never be able to overcome it. Children can sense resentment no matter how hard you try to hide it. I don't mean for you to be satisfied with what he is doing. We have to strive for improvement all the time. I know at times I've been so happy that my child was saying certain words or phrases that I didn't insist on his saying them right. After awhile he thinks he's right and I'm wrong.

Consistency is a word I've heard so often in the last few years. Be consistent. It really pays off too. I'm sure this is true with all children, but especially so with hearing impaired children. They cannot understand why it's alright to do something today but not tomorrow. With a three year old normal hearing child you may be able to explain why he can't do something today that he's done for the last three days, but most three year old deaf children do not have this much understanding.

If your normal hearing three year old child wants a cookie and you say "no" then you say, "Well, if you will stay in the kitchen it will be o.k." The normal hearing child will be able to understand this. The deaf child would not. If you say "no" then be prepared to stick to it or the child will soon think that no means yes.

When your three year old starts in the daily nursery program, you may think your responsibilities of working at home are over. Well, you could never be more wrong. You are just ready to get started. Unless you reinforce at home what your child learns in class he is not going to do very well. He goes to class three hours a day, four days a week. The rest of the time you are responsible for giving him language.

There are so many ways to give a deaf child language. All you have to do is talk about everything you do and everything you see. Ray has learned a lot riding in the car to school each day. He knows where all the bus stops are and the fire alarms. He learned what a stop sign meant in about three trips across town. You can talk about the traffic lights, the different colors of cars on the street, the things you see in store windows, and many other things.

The first colors Ray learned were the different colors of M & M's. As he learned these colors he was anxious to learn other colors. He would ask what color everything was.

We used to go to the park and feed the ducks every week until he learned to say "duck". Once after we got home I made a little book using stick figures. There was a picture of the family standing in front of the house getting ready to go. The next was the car on the street. Then there was the children throwing bread to the ducks, etc. This little book gave us a lot to talk about. He enjoyed it and learned from it too. This could be done with any trip.

When Ray was learning the names of animals we took him to the zoo. It meant a lot more to him to see the animals than to see a picture of them.

APPENDIX C

Dissemination of Information

Dissemination of Information

Formal papers and addresses

During the course of the project the various staff members were invited to national, regional, and state meetings to discuss and describe the Home Teaching program, or some of its facets. These presentations listed chronologically are presented below:

Nov. 20, 1966 - Home management programs for young deaf children
American Speech and Hearing Association Annual Convention,
Washington, D. C.
Paper by Mrs. Kathryn Horton

Mar. 16, 1967 - Responsibilities in education of hearing impaired children
State Meeting on Services for the Hearing Impaired
Indianapolis, Ind.
Paper by Dr. Freeman McConnell

Mar. 29, 1967 - A home teaching program for the deaf infant
Council for Exceptional Children Convention
St. Louis, Mo.
Paper by Mrs. Kathryn Horton

May 13, 1967 - The diagnosis and treatment of the multiple-handicapped child from the multi-discipline point of view
Institute on the Handicapped Child, East Tennessee State University
Johnson City, Tenn.
Paper by Dr. Freeman McConnell

Oct. 6, 1967 - Home teaching programs for young deaf children
Southwest Regional Conference, Alexander Graham Bell Association for the Deaf
Dallas, Texas
Paper by Mrs. Kathryn Horton

May 24, 1968 - A parents' guide for preschool deaf children
Symposium on the Hearing Impaired Child, East Tennessee State University
Johnson City, Tenn.
Paper by Dr. Freeman McConnell

June 29, 1968 - Programming for infants: implications for the future
Annual Convention, Alexander Graham Bell Association for the Deaf
San Francisco, Calif.
Paper by Mrs. Kathryn Horton

July 29, 1968 - Philosophical framework for the habilitation and rehabilitation of the hard of hearing
Institute on Aural Rehabilitation, University of Denver
Denver, Colo.
Paper by Dr. Freeman McConnell

Nov. 14, 1968 - Audiology and education of the deaf: implications for the professional preparation of audiologists
Annual Meeting, Academy of Rehabilitative Audiology
Denver, Colo.
Paper by Dr. Freeman McConnell

Mar. 28, 1969 - The deaf child and his parents
Southeast Regional Meeting, Alexander Graham Bell Association for the Deaf
Nashville, Tenn.
Panel discussion by Mrs. Ann Sitton

Mar. 29, 1969 - Programs for deaf infants
Southeast Regional Meeting, Alexander Graham Bell Association for the Deaf
Nashville, Tenn.
Paper by Mrs. Laura Knox

April 10, 1969 - Management of deafness in infants and very young children through their parents
Annual Convention, Council for Exceptional Children
Denver, Colo.
Paper by Mrs. Sue Lillie

June 20, 1969 - A nursery school orientation with hearing children
Seminar, Minnesota Dept. of Education and the University of Minnesota
Minneapolis, Minn.
Paper by Mrs. Kathryn Horton

July 14, 1969 - A closer relation between audiology and education of the deaf
Institute on Audiology for Deaf Educators
University of Kansas Medical Center
Kansas City, Kans.
Paper by Dr. Freeman McConnell

Sept. 29, 1969 - Project change through self-appraisal
Conference on Early Childhood Education Projects, Office of Education
Washington, D. C.
Paper by Mrs. Kathryn Horton

Nov. 14, 1969 - A home teaching program for young deaf children
American Speech and Hearing Association Annual Convention
Chicago, Ill.
Paper by Mrs. Kathryn Horton

Nov. 14, 1969 - Helping parents make the home environment meaningful
American Speech and Hearing Association Annual Convention
Chicago, Ill.
Paper by Mrs. Laura Knox

Nov. 14, 1969 - Audiologic management of under three's
American Speech and Hearing Association Annual Convention
Chicago, Ill.
Paper by Mrs. Ann Sitton

Dec. 11, 1969 - A home teaching program for parents of very young deaf children
Council for Exceptional Children Conference on Early Childhood Education
New Orleans, La.
Paper by Dr. Freeman McConnell

Dec. 11, 1969 - An early intervention program for the hearing impaired child
Council for Exceptional Children Conference on Early Childhood Education
New Orleans, La.
Paper by Mrs. Laura Knox

Publications

Horton, Kathryn B. Home demonstration teaching of parents of very young deaf children. Volta Review, 70 (Feb. 1968), pp. 106-113.

Wildman, Elizabeth, Sitton, Ann, and McConnell, Freeman. A program for parents of deaf infants. J. Tenn. Med. Association, 61 (April 1968), pp. 391-394.

McConnell, Freeman (Editor). Proceedings of the Conference on Current Practices in the Management of Deaf Infants (0-3 yr.) Nashville, Tenn.: U.S. Office of Education Grant No. 32-52-0450-6007, (June 21-22, 1968).

McConnell, Freeman. Philosophical frame work for rehabilitation and habilitation of the hard of hearing. In Alpiner, J. (ed.) Proceedings of the Institute on Aural Rehabilitation, University of Denver, RSA Grant No. 212-T-68, (July 1968), pp. 2-13.

Knox, Laura L. and McConnell, Freeman. Helping parents to help deaf children. Children, 15 (Sept.-Oct. 1968), pp. 183-192.

Fitzgerald, Mary D., Sitton, Ann, and McConnell, Freeman. Audiometric, developmental, and learning characteristics of a group of rubella deaf children. J. Sp. and Hearing Dis. In Press.

McConnell, Freeman. A new approach to the management of childhood deafness. In Karzon, David (Ed.). Pediatric Clinics of North America. In Press.

Film

During the closing months of the project a ten-minute film entitled "First Listening Lessons for Very Young Deaf Children" was produced by the project staff with technical assistance and consultation from Mr. Tom Mayhew of Multi-Media Services, Inc. One copy of the film to be included with the Final Report is being sent under separate cover to the U. S. Office of Education. The film was conceived as the first in a series of six or more ten-minute dissemination films that would demonstrate for interested groups the manner of working with parents of young deaf children and with the children themselves. Exploration is under way to determine if funding for such a means of dissemination can be obtained. The film was shown on Film Theater at the American Speech and Hearing Association Annual Convention in Chicago (November 1969). It was also shown in March 1969 at the Southeastern Regional Meeting of the Alexander Graham Bell Association for the Deaf in Nashville, and in December 1969 at the Council for Exceptional Children Conference on Early Childhood Education in New Orleans.

Parents' manual

The Parents' Manual is a compilation of methods and materials which can be used in the home. The contents emerged from the day-to-day program of visits with the teachers made by the parents of young children enrolled in the Home Teaching program. This manual with editing and revision may also be considered a potential means of disseminating the methods of the program and might possibly be reproduced or published. Copies of the Parents' Manual are not included with the Final Report, since it still requires revision with ongoing use.

Conference

A workshop-type conference was held in June 1968 with financial support from the grant. Approximately 30 persons from over the United States participated by invitation. Only those intimately involved in parent programs were invited. Five copies of the propgram are included with this report.